FOREWORD

The Twenty-third Annual Report differs little from previous reports of the Canadian Plant Disease Survey in general scope and arrangement. The work of compilation has been shared along the lines of last year. Some minor changes in arrangement have been made, to avoid the wide separation of closely related plants that are subject to the same diseases. In Section IV, the hosts have been grouped under Pome Fruits, Stone Fruits, Ribes spp., Rubus spp., and Miscellaneous; the crops being taken up alphabetically within each group. Section V has been re-named "Diseases of Trees and Shrubs" in order that certain genera, such as Viburnum, that contain both trees and shrubs may be treated in a single section. Genera containing only shrubs, such as Rosa, have been retained among the ornamentals. There is no intention of increasing the scope of the Survey to include wild shrubs, though records complementary to those dealing with trees or ornamental shrubs may be incorporated. Similar rearrangements were contemplated within and between Sections II and III, but have been abandoned for the present until a more satisfactory classification can be worked out.

With the close of the 1944 season, the Plant Disease Survey will have been in existence for 25 years. It began as a truly voluntary effort of the plant pathologists in Canada. Thanks to the Dominion Botanist, its compilation and publication, however, have been the responsibility of the Division. The Survey and the Mycological Herbarium became the prime responsibility of the senior compiler upon his transfer to Ottawa in 1929. Although the Survey has been recognized as a project of each of the Laboratories of the Division, the collection and submission of data have been on a purely voluntary basis, the scope and extent of the observations in the territory served by each Laboratory being at the discretion of the Officer-in-Charge. In consequence, observations have often been too limited, even for diseases of economic importance, to assess their importance throughout the Dominion and from year to year. This fact has given the Reports a more miscellaneous character than is desirable.

The Reports have been compiled with care, particularly with respect to the accurate determination and correct naming of the pathogens reported. Indeed, what has been accomplished in this regard may well be their chief merit. It has been a fixed policy to request specimens for study and deposit in the Mycological Herbarium, whenever a disease was new and uncommon. In addition, many specimens have been sent without solicitation.

The present Report is notable for the amount of critical mycological work reported therein, which was made possible through the assistance of the junior compiler. This increased mycological activity has only served to emphasize the close interdependence of the Mycological Herbarium and the Plant Disease Survey. The Herbarium is a necessary tool for critical studies on the identity and distribution of parasitic fungi, for a representative series of specimens is decidedly more valuable in identifying a fungus than an adequate description in some mycological work. Unfortunately, in too many instances, fungi are unrepresented in the Herbarium from areas in which they surely occur.

To fill these gaps we must depend largely upon our contributors. May we urge that a specimen for the Mycological Herbarium be submitted with the record whenever a disease that is new or uncommon to the district is encountered. Since the identity of a pathogen can only be tentatively determined in the field, ample material must be collected and suitably pressed at the time. Moreover, we, in turn, often desire to send material for confirmation or determination to a specialist of the group. Ample material permits us to do this without embarrassment. Material not needed in the Herbarium is valuable for exchange.

We have also noticed that the number of records received with incomplete host identifications appears larger than necessary, and we believe such identifications would add greatly to the value of the records. We suggest that, in doubtful cases, identifiable material (flowers or fruit) be included with the specimens. It may be possible to complete their identification at Ottawa, with the facilities available. Recent experience with several genera of ornamental plants has emphasized the importance of adequate specimens, especially of shrubs, for critical examination has shown that as much as half the material received from nurseries may be incorrectly named.

The following special reports are included in the present Report: "Flax Diseases in Saskatchewan in 1943" by Prof. T. C. Vanterpool; "Soybean Diseases in 1943" by Drs. L. W. Koch and A. A. Hildebrand; "Diseases of Sugar Beets in Southwestern Ontario in 1943" by Dr. Hildebrand, and a report on tobacco diseases by Dr. Koch.

Last year it was noted that many of the observations in the three Prairie Provinces were the work of several co-workers and were summarized before submission. Where the summary was not attributed to one person, the initials of the compiler, rather than his name, is being appended to distinguish such joint notes from individual contributions of the compilers.

Our thanks are due to all who have contributed to the Survey. Special mention may be made of Dr. J. Emile Jacques, Prof. J.E. Howitt, Dr. J.D. MacLachlan, Dr. A.D. Baker, several of the District Potato Inspectors, and of Dr. R.O. Lachance for translating "New and Noteworthy Diseases". Finally, the senior compiler wishes to express his thanks for the constant interest and encouragement accorded him in the conduct of the Survey by Dr. Gäussow, before the latter's retirement after 35 years' service as Dominion Botanist.

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May 31, 1944,
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New or Noteworthy Diseases

Stem rust (Puccinia graminis) was of almost no economic importance on wheat in the Prairie Provinces in 1943. The disease was rarely found in Man. and Sask. in the former "rust area", where virtually no wheat susceptible to stem rust is now grown. In Eastern Canada, stem rust appears to have been quite severe in some sections. The stem rust situation in oats was strinkingly different. The rust was more prevalent than usual throughout the Prairie Provinces, and it was fairly abundant in the East. In Man. not only fields of susceptible oat varieties became quite heavily infected, but heavily rusted spots appeared in fields of the new rust-resistant varieties. It was experimentally shown that these rusted areas were due to races heretofore of rare occurrence.

A notable observation among the leaf rusts, was the heavy aecial infection of crown rust (Puccinia coronata) on Rhamnus cathartica in Man. Fortunately the few bushes that do occur are located in towns and cities and are usually distant from oat fields. Although crown rust became fairly heavy on oats, the buckthorn bushes are so few that their presence probably had little bearing on rust development on the oats.

The prevalence of common root rot in Sask. in the years 1941 to 1943 is compared by calculating the mean disease rating for each season. The rating was low in 1942, when an excellent wheat crop was realized, moisture was abundant and soil temperature low. In the other two years, an average crop was harvested, drought conditions were present in large areas and soil temperatures were, at times, high. These values, unfortunately, are not directly comparable with those obtained in Man. (P.D.S. 21:2), where the prevalence of common root rot is expressed as a percentage reduction in yield for 1939, 1940 and 1941, but they do demonstrate the same seasonal variation.

Browning root rot (Pythium spp.) was recorded from all three Prairie Provinces. For the first time in many years, the disease was severe on wheat in the heavier soils of the Regina plains and of the Rosetown area in Sask. A severe outbreak was also recorded in one or two areas in Man.

The oat nematode (Heterodera avenae) caused little apparent damage in the infested areas in Ont., but, as Dr. A.D. Baker points out, conditions were, nevertheless, unusually favourable for the increase of the nematode, and severe injury may be expected in 1944 if the season, particularly the spring, is dry.

Black smut (Ustilago nigra) of barley was reported again from Man. and was found in Que. for the first time. Nearly 40% of the samples of loose smut obtained from widely separated parts of Que., when germinated by Dr. R.O. Lachance, proved to be U. nigra. While Lachance emphasizes that the finding is based on only one year's collections, it does confirm Tapke's observations and suggests that a considerable portion of the loose smut in Canada could be controlled by chemical seed treatment.

Two pathogens not previously reported on barley in Canada were Selenophoma Donacis var. stomaticola from Dodsland, Sask., and Septoria nodorum from Sperling, Man. A special survey of the diseases present on material from 26 uniform rust nurseries containing varieties of wheat, oats, and barley, scattered across Canada, was carried out at Winnipeg and the results are shown in tabular form. (c.f. p. 15)

Bacterial wilt (Corynebacterium insidiosum) has become a well-established and destructive disease on alfalfa in several parts of the dry interior of B.C. and in the irrigated areas of southern Alta. It was also found on unirrigated land in Alta in the Clover Bar district, east of Edmonton. Damage from winter-killing and crown rot was so severe in northern and north-central Alta. that 40% of the fields were destroyed or rendered worthless. In the northern sections, true winter-killing was chiefly responsible due to a light snow cover, while farther south, where the snowfall was higher, crown rot caused by a low-temperature basidiomycete was very active. Another low-temperature organism, which was recognized as a distinct pathogen in the root-rot complex of alfalfa and sweet clover in Alta. over 10 years ago has been described as a new species of Sclerotinia, S. sativa Drayton & Groves. It has also been encountered on tulips and narcissus.

Diseases of flax were in general not as destructive in 1943 as in the previous year. Browning (Polyspora Lini) infections were plentiful in Sask. in June, a condition that was not unexpected as the 1942 seed was known to be heavily infected. Little of the stem break stage appeared, due to the drier season, but there was some development of the browning stage just before harvest. The variety Royal appears to be as susceptible as Bison, but as yet, seed stocks of the former are not as heavily infected. Flax rust (Melampsora Lini) was again fairly severe in Sask. and Man., and in an occasional field of the rust resistant Royal a moderate infection occurred. Contrary to the general disease situation, seedling blight (Rhizoctonia Solani) was definitely more prevalent and caused considerable thinning of flax stands in Sask. and Man.

Special attention has been given to the diseases of several plants, the cultivation of which may yet be undertaken on a considerable scale. Worthy of mention are the discovery of Coleosporium delicatulum on Euthamia in the goldenrod plots at Ottawa, Ont., the occurrence of Puccinia Hieracii across Canada and of yellows (Callistephus virus 1) in the Maritimes on Koksaghyz, and the presence of Cercospora clavata, Uromyces Asclepiadis and a virus disease, tentatively referred to yellows (Callistephus virus 1), on milkweed in Ont. It has also been demonstrated experimentally that Puccinia Carthami, which causes a rust on safflower, is a brachy-form; the presence of pycnia were confirmed by observations at Winnipeg. Evidence was obtained that teliospores on the seed do cause infection on the young crop.

Of the diseases of soybean in southwestern Ont., first place was given to Fusarium blight (F. oxysporum f. tracheiphilum) followed by pod and stem blight (Diaporthe Phaseolorum var. Sojae), downy mildew (Peronospora manshurica), etc. Diseases new to Canada were the leaf spots (Phyllosticta

sojaecola, Cercospora sojina and Septoria Glycines). Blotch (Helminthosporium turcicum) on Sudan grass is another new record. While disease contributed to the reduction in yield and quality of sugar beets in southwestern Ont., this was the first season that Cercospora leaf spot (C. beticola) was not destructive. An interesting case of boron deficiency in sunflowers was recorded at Ottawa; down mildew (Plasmopara Halstedii) was unusually prevalent on the crop.

Among the vegetable diseases, a few observations have been chosen for comment. "Calapproved" bean seed from California gave crops free from bacterial blight (Xanthomonas phaseoli) and halo blight (Pseudomonas medicaginis var. phaseolicola) if the plantings were sufficiently isolated from diseased crops. Bacterial blight of carrot (Xanthomonas carotae) is now widespread in Canada, apparently through the use of seed carrying the pathogen. Yellows (Callistephus virus 1) is now reported in carrots from every province in Canada except Ont. It is suggested, however, that it may soon be found in the latter province, as purple top of potato was reported there for the first time this past season. Ansatospora macrospora (Osterw.) Newh. is reported as the cause of a serious storage crown rot of celery, under observation in New York State and Ont. for several years. Other diseases new to Canada are blight (Phoma Anethi) on dill in Ont., white rust (Cystopus candidus) on horseradish in Que., blight (Heterosporium Allii) on leek in B.C., and a leaf spot of spinach caused by an undescribed Cercospora in Que. The suggestion is made that Ramularia Pastinacae and Cercosporella Pastinacae are phases of the same fungus causing leaf spot on parsnip.

Bacterial ring rot (Corynebacterium sepedonicum) of potato continues to be prevalent in table stock in several Canadian provinces. Its apparent increase is in part due to the greater effort being made to discover its presence, but in the meantime its spread has not been altogether halted. An extended survey revealed the disease on more farms in southern Alta. than before, but the average number of diseased plants in the affected fields was less, probably as a result of regulations governing the source of seed. A survey in Man. showed that ring rot is an important factor in the poor quality of Manitoba-grown potatoes. In Ont., the survey was largely concentrated in the main areas and should effectively prevent its further spread among the principal growers. The situation in Que. and N.B. is not known with certainty. There was a slight decline in the number of fields entered for certification that showed ring rot.

Late blight (Phytophthora infestans) was unusually destructive in eastern Canada in 1943, and losses from tuber rot were considerable, except where unusual efforts were made to control the disease. It was epidemic for the third successive year in Man. and was found in Alta. for the first time, but it has not yet been reported from Sask. Late blight was also destructive to the late green tomato crop.

Leaf roll (virus) was also very prevalent, and, while the losses are less spectacular, its presence is one of the main difficulties in the production of certified potato seed.

Fire blight (Erwinia amylovora) caused considerable damage on apple in Alta., Man., Ont. and Que. and in young pear orchards in the Niagara Peninsula, Ont. Apple scab (Venturia inaequalis) was unusually severe throughout eastern Canada. Western X disease (virus) of peach again increased in prevalence in the southern Okanagan Valley, B.C., while X disease (virus) increased only slightly in Ont. What appears to be the European plum pocket (Taphrina Pruni) was found in B.C.; this may be the first authentic material of this fungus in Canada, most early records being referable to T. communis. A promising achievement of the Division of Horticulture, Central Experimental Farm, Ottawa, is the development of a black currant resistant to white pine blister rust (Cronartium ribicola) with fruit of good quality and high ascorbic acid content. An authentic record of yellow rust (Phragmidium Rubi-idaei) on cultivated raspberry was obtained from Ont. Late yellow rust (Pucciniastrum americanum) was serious on Viking raspberry in N.B., up to 30% of the fruit being unsaleable in some plantings. Canker (Godronia Cassandrae) caused serious killing of blueberry bushes in B.C.; previously reported from Que.

Leaf spots of maple, due to Cylindrosporium pennsylvanicum, Phyllosticta minima, P. minutissima, and Phleospora Aceris, were common in eastern Canada; the last is a new report for Canada, and P. minutissima is new to eastern Canada. Several interesting reports were made on Viburnum: Phyllosticta ? punctata in Man., Plasmopara Viburni in Ont., Puccinia Linkii on V. trilobum in N.S. (previously known only on V. pauciflorum) and Ramularia Viburni in Ont. Attention is drawn to the evident identity of Labrella Coryli, reported from B.C. (P.D.S. 22:vi, 92), with Gloeosporium Coryli known from eastern Canada.

Among the diseases of ornamentals may be mentioned: Downy mildew (Basidiophora entospora) heavy on Aster at Ottawa, Ont.; aster yellows (virus) severe on Callistephus and other hosts in eastern Canada; rust (Coleosporium Campanulae) destructive at Ottawa on Campanula rapunculoides; leaf spot and stem blight (Ascochyta ?clematidina) on Clematis spp. in Man. and Ont.; leaf spot (Phyllosticta Digitalis) on Digitalis spp. at Ottawa, Ont., a new record; rust (Pucciniastrum sp. on Epilobium and Clarkia at Ottawa, Ont.; smut (Entyloma Compositarum on Gaillardia at Ottawa, Ont., first record for eastern Canada; leaf spot (Pseudomonas gardeniae) on Gardenia in Ont., new record; spotted wilt (virus) severe on Lachenalia, etc. at Montreal, Que.; anthracnose (Glomerella cingulata) severe on sweet pea, London, Ont.; downy mildew (Plasmopara viticola heavy on Parthenocissus (not previously reported in Canada) and Vitis in Ont. and Que.; blister rust (Cronartium ribicola) on Ribes, found for the first time in Man.; leaf spot (Ramularia lactea) on pansy in B.C., new record. In last year's report (P.D.S. 22:vi, 86, 90), Cercospora circumcissa was reported on Prunus spp. including P. virginiana and P. serotina. Dr. Chupp (in litt.) has pointed out that the Cercospora on Prunus serotina is Cercospora graphioides Ell., which is distinct from C. circumscissa on the other species of Prunus.

Maladies Nouvelles ou d'Importance Notable

R.O. Lachance

En 1943 la rouille de la tige du blé (Puccinia graminis) n'eut à peu près pas d'importance économique dans les provinces des Prairies. On ne trouva que rarement cette maladie au Manitoba et en Saskatchewan, dans les régions où la rouille sévissait généralement et où maintenant l'on ne cultive plus les variétés susceptibles. Dans l'Est, la rouille de la tige a été apparemment grave dans quelques sections. Sur l'avoine, la rouille de la tige s'est comportée tout différemment. Cette rouille fut plus abondante que d'habitude dans les provinces des Prairies et assez généralement répandue dans l'Est. Au Manitoba, non seulement les champs ensemencés avec les variétés susceptibles furent gravement infestés, mais encore des secteurs considérablement rouillés ont été observés dans les champs ensemencés avec de nouvelles variétés résistantes. On a démontré de façon systématique que ces secteurs rouillés étaient dus à la présence de races biologiques qui jusqu'ici n'avaient été que rarement observées.

Une observation significative au sujet des rouilles des feuilles est l'infestation grave de Rhamnus cathartica par les écidies de rouille couronnée (Puccinia coronata) au Manitoba. Heureusement le peu d'arbustes que l'on rencontre se trouvent dans les villes et villages généralement assez éloignés des champs d'avoine. Bien que la rouille couronnée ait été assez grave, il est probable que la présence de plants de nerprun, à cause de leur petit nombre, n'a pas eu une influence considérable sur le développement de cette rouille.

L'importance de la pourriture commune des racines en Saskatchewan durant les années 1941-43 fut comparée en calculant la moyenne d'estimation pour chaque saison. Cette moyenne était faible en 1942 alors que la récolte fut excellente, l'humidité abondante et la température du sol peu élevée. Pour les deux autres années, alors que la sécheresse a sévi dans plusieurs régions et que la température du sol fut quelquefois élevée, la récolte fut moyenne. Malheureusement les données obtenues en Saskatchewan ne sont pas directement comparables avec celles qu'on a obtenues au Manitoba (P.D.S. 21: 2) où l'importance de pourriture des racines fut exprimée en pourcentage de réduction du rendement pour les années 1939, 1940 et 1941; on y retrouve cependant les mêmes variations saisonnières.

La pourriture pythienne des racines (Pythium spp.) fut observée dans les trois provinces des Prairies. Pour la première fois, depuis nombre d'années, cette maladie fut grave sur le blé cultivé sur les sols lourds des plaines de Régina et de la région de Rosetown en Saskatchewan. On a également observé une épidémie assez grave dans une couple de régions au Manitoba.

Le nématode de l'avoine (Heterodera avenae) a causé peu de dommages apparents dans les régions infestées de l'Ontario. Cependant, comme le fait remarquer le Dr A.D. Baker, les conditions ont été très favorables à l'augmentation des nématodes et l'on peut s'attendre à des dommages sérieux en 1944 si la saison et surtout le printemps est sec.

Le charbon noir (Ustilago nigra) de l'orge a été observé de nouveau au Manitoba et pour la première fois dans Québec. Près de 40% des échantillons de charbon nu provenant de tous les districts agronomiques de Québec ont donné des cultures de U. nigra. Bien que le Dr R.O. Lachance, qui a fait ces essais, insiste sur le fait que ce ne sont là que les résultats d'une seule année d'observation, cela confirme les observations de Tapke et permet de croire qu'au Canada une proportion considérable du charbon nu de l'orge peut être enrayée par le traitement de la semence avec les désinfectants en poudre.

Deux pathogènes de l'orge ont été rapportés pour la première fois au Canada. Ce sont Selenophoma Donacis var. stomaticola observé à Dodsland, Saskatchewan et Septoria nodorum observé à Sperling, Manitoba. On a conduit à Winnipeg une enquête spéciale sur les maladies présentes sur le matériel récolté aux 26 stations d'observation sur les rouilles des céréales distribuées à travers tout le Canada et où sont cultivées diverses variétés de blé, d'orge et d'avoine. Les résultats sont consignés sous forme de tableau (voir p. 15)

La flétrissure bactérienne de la luzerne (Corynebacterium insidiosum) est maintenant une maladie définitivement établie dans plusieurs régions sèches de l'intérieur de la Colombie-Britannique et dans les districts irrigués du sud de l'Alberta où elle cause des ravages sérieux. On l'a également observée sur les terres non irriguées dans le district de Clover Bar à l'est d'Edmonton. Les dommages causés par la gelée et la pourriture de la couronne furent si graves dans le Nord et le Nord-Centre de l'Alberta que 40% des champs furent détruits ou presque. Dans les régions les plus au nord, la gelée est principalement responsable de cet état de chose à cause du peu de neige qui recouvrait le sol, tandis que dans les régions plus au sud où la couche de neige était plus épaisse, la pourriture de la couronne, causée par un basidiomycete croissant à basse température, a prédominé. Une espèce nouvelle de champignon croissant à basse température Sclerotinia sativa Drayton & Groves a été décrite; elle était considérée il y a déjà plus de 10 ans comme un pathogène bien défini, constituant du complex de champignons responsables de la pourriture des racines de la luzerne et du trèfle d'odeur en Alberta. Cette espèce de Sclerotinia a aussi été observée sur les tulipes et les narcisses.

En général, les maladies du lin ne furent pas aussi destructives en 1943 que l'année précédente. L'oxychromose polysporéenne (Polyspora Lini) fut abondante en juin en Saskatchewan; l'on s'attendait à cet état de chose vu que la graine en 1942 était infestée de ce champignon. Toutefois les symptômes de brisement des tiges ne se montrèrent que très peu à cause de la sécheresse cependant que le brunissement s'est développé quelque peu juste avant la récolte. La variété Royale est apparemment aussi susceptible que la Bison. Toutefois, jusqu'à date, la semence de la variété Royale n'est pas aussi gravement infestée que celle de la variété Bison. La rouille du lin (Melampsora Lini) fut assez grave cette année en Saskatchewan et au Manitoba, et l'on a observé quelques champs de la variété Royale modérément infestés de rouille; cette variété est résistante à la rouille. Par contraste avec l'état général des maladies, la brûlure des plantules (Rhizoctonia solani) fut beaucoup plus répandue et détruisit un nombre considérable de plants en Saskatchewan et au Manitoba.

On a prêté une attention particulière aux maladies de plusieurs plantes dont la culture pourrait être entreprise sur une grande échelle. Sont

dignes de mention, la découverte de Coleosporium delicatulum sur Euthamia dans les parcelles de verge d'or à Ottawa, Ont., la présence de Puccinia Hieracii à travers tout le Canada et de la jaunisse (Virus Callistephus 1) dans les Maritimes sur le kok-saghyz et la présence de Cercospora clavata, d'Uromyces Asclepiadis et d'une maladie à virus temporairement classifiée comme jaunisse (Virus Callistephus 1) sur l'Asclepiade en Ontario. On a également démontré de façon expérimentale que Puccinia Carthami qui cause une rouille sur Carthamus tinctorius est brachycyclique; la présence des pycnies fut confirmée par des observations faites à Winnipeg. On a acquis la preuve que les téliospores présentes sur les graines causent l'infection de la nouvelle récolte.

Des maladies de la fève soja dans le Sud-Ouest de l'Ontario, la plus importante est la brûlure fusarienne (F. oxysporum f. tracheiphilum). Viennent ensuite la brûlure des tiges et des gousses (Diaporthe Phaseolorum var Sojae), le mildiou (Peronospora manshurica), etc. Les maladies nouvelles pour le Canada sont: les taches des feuilles (Phyllosticta sojaecola, Cercospora sojina et Septoria Glycines). La tache helminthosporienne (Helminthosporium turcicum) de l'herbe du Soudan est rapportée pour la première fois. Bien que les maladies aient contribué à réduire les rendements et la qualité des betteraves sucrières dans le Sud-Ouest de l'Ontario, c'est la première saison que la tache cercosporéenne des feuilles (Cercospora beticola) ne fut pas destructive. A Ottawa on a observé un cas intéressant de carence de bore sur tournesol. Le mildiou (Plasmopara Halstedii) fut particulièrement grave sur cette plante.

Parmi les maladies des légumes, quelques observations ont été triées et sont commentées. De la semence de haricot dite "Calapproved", importée de Californie, a donné des récoltes exemptes de brûlure bactérienne (Xanthomonas phaseoli) et de brûlure auréolée (Pseudomonas medicaginis var phaseolicola), lorsque les champs étaient suffisamment isolés des autres champs malades. La brûlure bactérienne des carottes (Xanthomonas carotae) est maintenant répandue au Canada, apparemment à cause de l'usage de semence porteuse du pathogène responsable. La jaunisse (Virus Callistephus 1) est maintenant signalée de toutes les provinces du Canada sauf l'Ontario. Il est possible, toutefois, qu'on la trouve bientôt dans cette province, puisque la tige pourpre de la pomme de terre y fut signalée pour la première fois l'été dernier. Ansatospora macrospora (Osterw) Newh. est signalé comme l'agent responsable d'une grave pourriture du collet du céleri en entrepôt, maladie qui a été observée et étudiée à New-York et en Ontario durant plusieurs années. D'autres maladies nouvelles au Canada sont la brûlure phoméenne (Phoma Anethi) de l'aneth en Ontario, la rouille blanche (Cystopus candidus) du rainfort dans Québec, la brûlure hétérosporienne (Heterosporium Allii) sur le poireau en Colombie-Britannique et la tache des feuilles des épinards causée par une espèce non décrite de Cercospora dans Québec. On suggère que Ramularia Pastinacae et Cercosporella Pastinaceae ne sont que deux phases du même champignon qui cause une tache des feuilles du panais.

La flétrissure bactérienne des pommes de terre (Corynebacterium sepedonicum) est toujours abondante dans les pommes de terre de consommation dans plusieurs provinces canadiennes. Son augmentation apparente est due en partie aux efforts que l'on fait pour la dépister; ces efforts toutefois n'ont pas empêché sa dissémination. Une enquête détaillée a révélé qu'elle était présente sur un plus grand nombre de fermes qu'auparavant en Alberta, cependant que les pourcentages de plants atteints dans les champs où elle était présente était moindre, probablement à cause des règlements concernant la source de la semence.

Une enquête faite au Manitoba a démontré que la flétrissure est un facteur important responsable de la pauvre qualité des patates cultivées dans cette province. En Ontario, l'enquête fut restreinte aux principales régions et devrait avoir pour résultat de prévenir sa dissémination chez les principaux producteurs. On ne connait pas avec certitude la situation dans le Québec ni au Nouveau-Brunswick. Il y eut cependant une légère diminution dans le nombre de champs refusés à la certification à cause de cette maladie.

La brûlure tardive (Phytophthora infestans) fut particulièrement destructive dans l'Est du Canada en 1943 et les pertes causées par la pourriture des tubercules furent considérables, sauf là où on a fait des efforts extraordinaires pour enrayer la maladie. Elle constitua une épidémie pour la troisième année consécutive au Manitoba et fut observée en Alberta pour la première fois, toutefois on ne l'a pas encore rapportée de la Saskatchewan. La brûlure tardive fut également destructive sur les tomates vertes tardives.

L'enroulement des feuilles (virus) fut également très répandu et quoique les pertes que cause cette maladie soient moins évidentes à l'oeil, elle n'en constitue pas moins un des pires obstacles à la production des pommes de terre certifiées.

La brûlure bactérienne (Erwinia amylovora) a causé des dommages considérables aux pommiers en Alberta, au Manitoba, en Ontario, dans Québec et dans les jeunes vergers de poiriers dans la péninsule de Niagara, Ont. La tavelure (Venturia inaequalis) fut particulièrement grave à travers l'Est du Canada. La maladie X de l'Ouest (virus) du pêcher a de nouveau pris de l'importance dans la vallée d'Okanagan, C.B., tandis que la maladie X (virus) n'a que très peu augmenté en Ontario. On a observé en Colombie-Britannique une maladie qui semble être la pochette européenne du prunier (Taphrina Pruni); il est possible que ce soit là la première collection authentique de ce champignon au Canada, les spécimens récoltés antécédemment appartenant à l'espèce T. communis. Une réalisation prometteuse de la Division de l'Horticulture de la Ferme Expérimentale Centrale à Ottawa est la création d'un cassis résistant à la rouille vésiculeuse du pin blanc (Cronartium ribicola) et qui possède des fruits de bonne qualité et riches en acide ascorbique. En Ontario, on a observé un cas certain de rouille jaune (Phragmidium Rubi-idaei) sur les framboisiers cultivés. La rouille jaune tardive (Pucciniastrum americanum) fut assez grave sur le framboisier Viking au Nouveau-Brunswick où dans quelques plantations jusqu'à 30% des fruits étaient invendables. Le chancre (Godronia Cassandrae) a causé la destruction d'arbrisseaux de bluets en Colombie-Britannique; cette maladie a déjà été observée dans le Québec.

Des taches des feuilles de l'érable causées par Cylindrosporium pennsylvanicum, Phyllosticta minima, P. minutissima et Phleospora Aceris ont été observées communément dans l'Est du Canada. Le dernier organisme est nouveau pour le Canada tandis que P. minutissima l'est pour l'Est. On a fait des observations intéressantes sur le Viburnum, à savoir: Phyllosticta ?punctata au Manitoba, Plasmopara Viburni en Ontario, Puccinia Linkii sur Viburnum trilobum en Nouvelle-Ecosse (déjà connu sur V. pauciflorum) et Ramularia Viburni en Ontario. Notons qu'on a établi l'identité de Labrella Coryli observé en Colombie-Britannique (P.D.S. 22: vi, 92) et de Gloeosporium Coryli déjà connu dans l'Est du Canada.

Parmi les maladies des plantes ornementales mentionnons: le mildiou (Basidiophora entospora) infection grave sur l'aster à Ottawa, Ont; la jaunisse de l'aster (virus) infection grave sur Callistephus et autres hôtes dans l'Est du Canada; la rouille (Coleosporium Campanulae) grave sur Campanula rapunculoides à Ottawa; la tache des feuilles et la brûlure des tiges (Ascochyta ?clematidina) sur Clematis spp. en Ont. et au Man.; la tache des feuilles (Phyllosticta Digitalis) sur Digitalis spp. à Ottawa, Ont., (observation nouvelle); la rouille (Pucciniastrum sp.) sur Epilobium et Clarkia à Ottawa, Ont.; le charbon (Entyloma Compositarum) sur Gaillardia à Ottawa, Ont. (première observation dans l'Est du Canada); la tache des feuilles (Pseudomonas gardeniae) sur Gardenia en Ont. (première observation); la tache de bronze (virus), sur Lachenalia, etc., infection grave à Montréal, Qué.; l'anthracnose (Glomerella cingulata) sur les pois de senteur, infection grave, à London, Ont.; le mildiou (Plasmopara viticola) sur Parthenocissus, infection grave (première observation au Canada) et sur Vitis en Ont. et dans Qué.; la rouille vésiculeuse du pin blanc (Cronartium ribicola) sur Ribes observée pour la première fois au Man.; la tache des feuilles (Ramularia lactea) sur les pensées en C.-B. (première observation). Dans le rapport de l'an dernier (P.D.S. 22: vi, 86, 90), Cercospora circumscissa fut rapporté sur Prunus spp. y compris P. virginiana et P. serotina. Le Dr Chupp (in litt.) a noté que le Cercospora qui attaque Prunus serotina est Cercospora graphioides Ell., différent de C. circumscissa qui attaque les autres espèces de Prunus.

The Weather and Its Influence on Plant Diseases

During the early part of the 1942-43 winter, the weather was mild and wet in the coastal areas of B.C.; during late January it was colder than normal; and the remainder of the winter was mild and comparatively dry. As a result of the cold period and possibly the preceding mild, wet weather, there was considerable winter injury of some overwintered seed crops such as cabbage and swedes, as well as of some ornamental plants.

Late blight of potatoes appeared later than usual; it is considered that the cold weather was a factor in killing unharvested affected tubers that might have initiated early infection.

In spring, precipitation was slightly above normal and, as usual, such diseases as tulip fire, hop downy mildew and some foliage diseases became quite prevalent.

The summer was comparatively dry, though showery, and harvesting weather was satisfactory. Even under these conditions downy mildews did considerable damage to the seed crops of onions, lettuce and spinach. Onion downy mildew, in particular, will probably always be a serious limiting factor in the production of onion seed in the coastal areas. (W. Jones)

In north-central and northern Alta., extensive winter killing and crown rot occurred in alfalfa and other forage crops. This damage was particularly severe in the Athabasca and Peace River districts, where there was little or no snow protection during severe weather in January. In the other affected areas crown rot was unusually prevalent, despite the good snow cover, and most of the frost injury apparently occurred after growth started in early spring. Seeding was delayed by cool, wet weather, which continued throughout the growing season in most of the northern and central sections. As a result, many foliage and stem diseases developed earlier than usual and some of them became very prevalent. The leaf and stem rusts of cereals appeared in July, but were retarded by the cool weather and severe local infections developed only in the very late stands. The abnormally wet weather of the past two seasons was apparently responsible for the establishment and spread of late blight of potatoes and bacterial wilt of alfalfa in the Edmonton district. In southern Alta. drought conditions prevailed, with the result that crop yields were low and few foliage and stem diseases were in evidence. During the late fall harvesting was completed under particularly favourable conditions in all parts of the province. (M.W.C.)

In Sask., generally, the land was in good condition for sowing, but low temperatures and frequent frosts retarded germination until late in May, when warm weather stimulated development. Precipitation was light up to the end of May. Some rainfall during the first week in June improved moisture conditions, but heavy frosts caused injury to garden and grain crops. Browning root rot of wheat became widespread following warmer weather during the second week of June and was severe on summer fallow crops in many areas; it caused retardation and lack of stooling, in contrast with the rapid growth and heavy stooling in healthy fields. Rainfall continued below normal in all except south central, south east and east central districts. This continuous dry

weather caused deterioration in the crop, but also limited injury from leaf spots and smut, both of which were scarce this year. Flax rust developed rapidly in mid-June, but did not spread extensively because of the dry weather. Some local severe infections, even on previously resistant varieties, were reported. The crop matured rapidly with very little head infection and only a general, dry weather type of common root rot. This was in contrast with the slow maturing crop of 1942 when moderate head infections and severe common root rot were present. Ergot of cereals was light this year in spite of the presence of many sclerotia in the seed and in the soil. This disease was undoubtedly checked by the dry weather. Unusually warm weather in Sept. caused the loss of many carrots in storage. (H.W. Mead)

Although abundant rains, well distributed throughout the growing period, afforded excellent conditions for the germination of rust spores in Man., cereal rusts, owing to adverse winds for northward dispersal of spores and to unfavourable temperatures during May and June, made little progress during the early part of the summer. Temperatures averaged 4 degrees below normal for May and June and during that period the air movement was generally from north to south, broken only infrequently by southerly winds usually of short duration. However, from the beginning of July to the end of the season the spread of rust was favoured by frequent and sustained southerly winds, and its development was favoured by temperatures slightly above normal. Not all the cereal rusts were affected to the same degree by the adverse weather factors. Stem rust of oats, which usually appears in Man. in late June and early July was only slightly retarded by the unfavourable weather of early summer; the later favourable conditions more than offset the early retardation and this rust became more prevalent than for several years past. The progress of leaf rust of wheat, crown rust of oats, and stem rust of wheat, which usually reach Man. before mid-June, was greatly checked by the adverse conditions in late May and June; although they developed rapidly during July and early August, their early retardation was not fully offset by the favourable conditions experienced later, and these rusts were somewhat less prevalent than usual. (B. Peturson)

On Feb. 14-15, temperatures ranging from 10 to 20° below zero in different sections of the Niagara peninsula, Ont., greatly injured peach fruit buds. In the western part of the district and on the escarpment, where temperatures were lowest, practically no buds survived. Elsewhere injury ranged from 30 to 60% buds killed. Some varietal difference in hardiness of buds was seen. Apparently as a combined effect of low temperature and of wet soil throughout the fall and winter, many peach trees were killed in poorly drained orchards.

April was unusually wet and cool, and May and June were also wet. After mid-summer the weather was generally dry.

Wet weather and soft ground interfered with dormant spray applications in peach orchards, with the result that leaf curl was abundant in orchards not sprayed before early March; after this date there was little opportunity for effective spraying.

Continued rains in May allowed heavy apple scab infection before bloom. The principal infection period was May 16-22, when frequent showers and poor drying conditions kept the trees almost continuously wet and prevented timely

spraying. Recurrent wet spells favoured spread of scab to fruit and new leaves. By mid-summer 73% of the foliage of unsprayed trees was severely scabbed and most fruit had either fallen or was badly scabbed. Sepal infection was common.

May weather favoured the development of brown rot apothecia, and blossom blight was common in all stone fruits. Brown rot of plums and peaches was less serious than anticipated, largely owing to the dry weather after mid-summer.

Leaf spot of sour cherries was not serious. Four moderately heavy ascospore discharges occurred before bloom and the unfolding of the leaves. Primary infection, evident on July 7, was light and presumably arose from the lighter discharges in June. The dry weather of late summer checked further development.

Fire blight was more abundant than for many years. The wet weather of May and June favoured the production and dissemination of exudate, and stimulated tree growth.

Downy mildew and black rot of grape were unusually abundant, especially where growth was dense. Growth of vines was heavy. (G.C. Chamberlain)

In the Ottawa district, Ont., and much, at least, of western Que., the season, except for July, was uncommonly wet and was somewhat cooler and cloudier than average. All spring planting was greatly delayed. There were two dry spells: July 6-18 was rainless at Ottawa, though thunder showers occurred elsewhere in the district; and from Sept. 15 to Oct. 14 there was only one inch of rain, all of which fell on two days. Precipitation was 70% above average in May and June, but was 40% below average in July, with the result that the heavy hay crop was largely gathered in good condition. August, with 9.05" against an average of 3.00", was the wettest ever recorded at Ottawa.

Downy mildews were unusually prevalent; several heavy attacks were noted on wild plants, in addition to the observations reported in the text under Aster, Hop, Radish, Sunflower, Viburnum, and Vitis.

Many foliage diseases were heavy, but certain rusts failed to develop to the extent anticipated from observations early in the season; attacks by Darluca filum were one factor in this inhibition. Although individual red clover plants in the open were heavily rusted, it was impossible to find the rust within some fields on July 1, the principal leaf parasite being Cymadothea. For the first time in the writer's experience slugs, long known to feed on rust sori, were an important controlling factor for at least two rusts: a natural infection of Puccinia orbicula on Prenanthes in the Arboretum was practically wiped out; and cultures of P. Carthami on safflower were completely destroyed in the greenhouse and in the open.

Most powdery mildews were scarce until early Oct. For the first time in many years, few plantings of perennial phlox were appreciably

disfigured by Erysiphe Cichoracearum. Even in Oct. heavily infected plants were rare, whereas generally all plantings are badly disfigured by the end of August, the disease being so common that it ordinarily escapes comment in the Survey. A notable exception was E. Polygoni on Delphinium, severe mid-season attacks being recorded in several places. (D.B.O. Savile)

In N.B. snow coverage was light and uneven throughout the winter and 27 days of sub-zero weather were experienced. April was cold, with considerable rain and snow. These conditions delayed soil drying. Due to a combination of cloudy weather, absence of drying winds, and cool nights, few fields were dry enough to work until the last week in May.

Horticultural crops, with the exception of roses and certain perennial plants came through the winter in good condition. Apples and small fruits wintered well. Pastures showed considerable winter injury and growth was slow in starting. Rain fell on 14 days in June, the total rainfall at Fredericton being 5.03". The wet weather considerably delayed planting, and many farmers did not finish seeding until early July. The rainfall for July also totalled 5.03". A downpour of 2.74" on July 30 caused considerable lodging in grain fields. August was also extremely wet, with 5.77" of rain. This rain lodged much grain and left many potato fields so wet that they could be neither cultivated nor sprayed. A total of 4.32" of rain was recorded for Sept., and 6.24" fell in Oct. In the six months' period May to Oct. inclusive, 29.85" of rain were recorded as compared with a 30-year average of 20.24".

There was comparatively little rust on grain. Late blight was prevalent on potato foliage, but little tuber rot was experienced except in unsprayed fields, where the crop was almost a total loss. The season was favourable for disease development in such crops as tomatoes, beans, squash and cucumbers. All crops matured late, particularly hay and grain. The fall was open and favourable to potato digging until Nov. 2. Despite this condition, due to delays caused by adverse weather a small acreage of potatoes and a considerable acreage of grain were unharvested. Ploughing ceased on Nov. 30 and on Dec. 2 the Saint John River froze over. (J.L. Howatt)

The winter and early spring of 1943 in Nova Scotia were generally favourable. Plants and trees wintered well and up until early in June soil conditions were favourable for spring farming operations. Some heavy rains early in May delayed operations for a few days. June, July and August were wet, with all the usual consequences. Compared with a 30 year mean of 9.25", the precipitation for these three months of 1943 totalled 16.71".

Orchard spraying was seriously affected by the weather and many growers failed to get the early sprays applied. The ascospores of Venturia inaequalis began functioning early in May and by June 10 unsprayed orchards showed up to 20% of the foliage affected. Conidia continued the spread of the fungus with disastrous results. It is estimated that less than 25% of the Nova Scotia apple crop packed out as No. 1 grade.

Potatoes suffered from wet soil during the season. Rotting of sets followed by a late blight epidemic caused severe losses in many fields.

Delayed digging of the crop avoided a still heavier loss in storage. The tomato crop was considerably reduced by conditions favoring both early and late blights. (J.F. Hockey)

Tree fruits, and small fruits other than strawberries, wintered well in P.E.I. Unfortunately the weather in 1943 was unusually favourable for the development of parasitic fungi and bacteria. As a consequence some important crops suffered greatly. A fairly dry April permitted early seeding in many areas. Early grain germinated well and developed excellent stands. In May, seeding was hindered by sustained rain (total 5.38" at Charlottetown). Germination, also, was retarded by the low mean temperature of 47.8° F. During this unfavourable period there were many outbreaks of seedling diseases, re-seeding being necessary in some instances.

Apple scab was destructive, being sustained by heavy and prolonged rains that seriously interrupted spray schedules. McIntosh, the main commercial variety, suffered severe scab infection, and the market quality of the crop was much lowered. Ascospore discharge began later than usual, but became general by mid-June, initiating an outbreak that developed rapidly and reached its peak in late Sept. Brown rot of stone fruits, always troublesome, caused a crop failure in 1943. Heavy blossom blight occurred during the humid weather of mid-June. With 3.48" of rain and a mean temperature of 64.6°F. in August, brown rot progressed rapidly, leaving most of the fruit infected both on the trees and on the ground. Plums reaching market in apparently sound condition rotted quickly.

Late blight of potatoes was exceptionally severe. Alternating days of rain and sunshine, with cool nights, were ideal for its development and spread in mid-July, and by the second week of Aug. many fields were completely destroyed. The mean Aug. temperature of 64.6°F. (optimum for mycelium development), together with frequent rains and heavy dews, gave perfect conditions for the epiphytotic, which continued through Sept. and until killing frosts occurred. Potato spraying conditions were most trying and many growers failed to protect their crops adequately. In spite of these difficulties, control of blight was achieved where spraying was done with the utmost attention to such requirements as frequency of application and spraying both ways on the row. Continued rains late in the season made good spraying impossible. With conditions remaining favourable for blight development, many growers had recourse to top killing and late digging, thus preventing serious tuber rotting.

Verticillium and Fusarium wilts of potato did not show up significantly in the field, wilting being noticeably offset by the unusually abundant soil moisture. Tuber examination, however, revealed that these diseases were active despite the absence of foliage symptoms. This was particularly true of table potatoes. Common scab, being a dry weather disease, was insignificant, while black leg, a wet weather disease, was very troublesome. (R.R. Hurst)

Phenological Data - 1943

by
R.C. Russell

The phenological data in the accompanying table are compiled from records secured by M.W. Cormack of Edmonton, R.C. Russell of Saskatoon, and B. Peturson of Winnipeg. Column "a" gives 1943 dates; column "b" gives number of days earlier or later than average. The figures in the "b" column have more significance each year as they are based on the average flowering date for a longer period as time goes on. In many cases now they are the average of seven or eight years' observations.

At the very beginning of the season the native plants commenced flowering a few days earlier than usual. All through May and June, however, the weather was relatively cool and growth was retarded so that the plants bloomed from 3 to 11 days later than usual. The season remained somewhat late at Winnipeg, but at Saskatoon and Edmonton flowers bloomed at the normal time, or a little earlier, after July 15.

Thatcher wheat matured relatively late at all three places in spite of the fact that it was sown at the normal time at Edmonton.

As was the case last year, the wheat harvest was delayed more than the flowering of the late species of plants.

Mr. Peturson also supplied the dates when the following rusts were noted in Manitoba:

Melampsora Lini I	10/6
Puccinia coronata Avenae I	16/6
" triticina II	21/6
" coronata Avenae II	7/7
" graminis Tritici II	12/7
" " Avenae II	12/7
" anomala II	25/7

For nine plants in the main list, Dr. W.H. Minshall has supplied the following data for first dates of anthesis at Ottawa:

Populus tremuloides	1/5	Anemone canadensis	7/6
Acer Negundo	9/5	Bromus inermis	21/6
Prunus pennsylvanica	22/5	Phleum pratense	24/6
Smilacina stellata	24/5	Solidago canadensis	24/7
Viola canadensis	12/5		

Dr. Minshall has also supplied the following figures for anthesis dates of four trees at Ottawa, to allow comparison of the 1943 season with preceding years:

	8-year Average	1942	1943
Acer saccharinum	15/4	3/4	23/4
Ulmus americana	30/4	23/4	7/5
Acer saccharum	11/5	29/4	19/5
Pinus sylvestris	28/5	18/5	2/6

Summary of Phenological Data taken at Winnipeg, Saskatoon, and Edmonton in 1943

Species	Winnipeg		Saskatoon		Edmonton	
	a	b	a	b	a	b
Pulsatilla Ludoviciana	-	-	17/4	1E	-	-
Populus tremuloides	22/4	4E	19/4	3E	19/4	3E
Phlox Hoodii	-	-	22/4	5E	-	-
Acer Negundo	5/5	2E	10/5	5L	1/5	N
Betula papyrifera	-	-	11/5	3L	13/5	5L
Thermopsis rhombifolia	-	-	14/5	5L	-	-
Prunus americana	20/5	7L	-	-	-	-
Amelanchier alnifolia	21/5	6L	15/5	3L	20/5	7L
Hierochloe odorata	23/5	4L	21/5	5L	-	-
Prunus pennsylvanica	-	-	24/5	5L	23/5	8L
Viola canadensis	-	-	22/5	7L	22/5	4L
Smilacina stellata	30/5	6L	3/6	11L	28/5	4L
Prunus melanocarpa	-	-	1/6	7L	31/5	7L
Crataegus sp. (Hawthorn)	30/5	7L	1/6	7L	4/6	?
Prunus virginiana	31/5	6L	-	-	-	-
Svida sp. (Dogwood)	4/6	7L	3/6	6L	8/6	9L
Lonicera glaucescens	-	-	15/6	10L	16/6	7L
Elaeagnus commutata	-	-	10/6	9L	10/6	8L
Viburnum Lentago	12/6	9L	-	-	-	-
Viburnum trilobum	20/6	11L	-	-	17/6	9L
Achillea lanulosa	-	-	16/6	8L	1/7	6L
Diholcos bisulcatus	-	-	18/6	9L	-	-
Galium boreale	-	-	21/6	9L	23/6	7L
Rosa alcea (open prairie)	-	-	27/6	8L	-	-
Anemone canadensis	18/6	10L	16/6	7L	21/6	4L
Campanula petiolata	-	-	28/6	6L	-	-
Gaillardia aristata	-	-	28/6	9L	-	-
Bromus inermis	27/6	6L	1/7	8L	3/7	7L
Agrimonia striata	-	-	-	-	4/7	4L
Symphoricarpos occidentalis	2/7	4L	8/7	?	6/7	3L
Phleum pratense	-	-	-	-	7/7	2L
Chamaenerion spicatum	-	-	-	-	13/7	5L
Lactuca pulchella	-	-	-	-	15/7	1L
Spiraea alba	-	-	5/7	1L	-	-
Chrysopsis hirsutissima	-	-	11/7	?	-	-
Solidago missouriensis	-	-	15/7	1L	-	-
Agastache anethiodora	-	-	-	-	11/7	1E
Grindelia sp. (Gum-weed)	21/7	?	25/7	?	-	-
Solidago canadensis	25/7	5L	-	-	20/7	3L
Cirsium Flodmanii	-	-	15/7	N	-	-
Oligoneuron canescens	-	-	25/7	2L	-	-
Aster laevis	-	-	30/7	1L	30/7	2E
Aster crassulus	-	-	25/7	5E	2/8	?
Thatcher Wheat:						
Sown	5/5	11L	3/5	8L	26/4	N
Emerged	15/5	12L	21/5	12L	9/5	1L
Headed	3/7	8L	7/7	9L	3/7	2L
Harvested	10/8	8L	15/8	11L	26/8	12L

I. DISEASES OF CEREAL CROPS

WHEAT

HEAD DISCOLORATION (Alternaria sp.). Infection was a trace at Carmen, Man., slight on 20% of the heads at Oak Bluff, and slight at Sanford (T. Johnson). A slight infection was recorded on C.D. 3285, and traces on 3 other varieties among the 12 varieties in the test at Ste. Anne de la Pocatière, Que. (C. Perrault). The same varieties were tested at Fredericton, N.B.; 3065-5-2 was severely and 3080-1-6 moderately discoloured, with lesser amounts in 3 others. Some discoloration was also present in the soft wheat test. (S.F. Clarkson)

LEAF SPOT (Ascochyta graminicola). A trace of infection was present on leaves collected at Beaverlodge, Alta., Sept. 30. Spores were 18.1 x 5.3 microns. (T. Johnson)

LEAF SPOT (Cladosporium graminum) was slight in one field and moderate in a second out of 105 fields examined in Alta.

ERGOT (Claviceps purpurea). A trace of ergot was recorded in 2 fields in Alta. No ergot was found on either wheat or brome grass at a point near Lacombe (P.D.S. 22:1), where it was severe in a field of wheat and on brome grass along the fence in 1942 (M.W.C.). A trace of ergot was present on Thatcher at Elm Creek, Man. (T. Johnson). A trace was observed on wheat, once in Queens Co. and once in Prince Co., P.E.I. (R.R. Hurst)

ROOT ROT (Cryptoascus sp.) affected 10% of the plants in a field in Queens Co., P.E.I. (R.R. Hurst)

POWDERY MILDEW (Erysiphe graminis) slightly infected all varieties at the Station, Sidney, B.C. in July (W. Jones). The disease was severe in a field near Lethbridge, Alta., and infection ranged from a trace to severe in the variety plots at this point. A slight infection occurred in one other field (M.W.C.). Powdery mildew was more prevalent than usual on winter wheat both in the plots at O.A.C. and about Guelph (J.D. MacLachlan). It was severe in the rust nursery (q.v.) at Edmonton, and moderate in those at Saanichton, B.C., and Lethbridge, Alta. (T. Johnson)

HEAD BLIGHT (chiefly Fusarium spp.) Traces of head blight were recorded from Man. eastward, including a survey of 21 fields in P.E.I., but in the rust nursery (q.v.) at Macdonald College, Que., a light infection was reported. Isolations from affected material yielded the following: Edmonton, Alta., F. culmorum and F. ?Poae (A.W. Henry); Winnipeg, Man., Thatcher, F. Scirpi var. acuminatum; Kapuskasing, Ont., C.T. 141, F. avenaceum; Ottawa, Apex, F. Poae and F. avenaceum; Macdonald College, Que., Marquis, F. Poae; Ste. Anne de la Pocatière, Apex, F. graminearum; Kentville, N.S., Renown and Regent, F. avenaceum. (W.L. Gordon)

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.) was found in 53 fields out of 105 examined in Alta. The damage was estimated to be a trace in 24, slight in 23, and moderate in 6. (M.W.C.)

Common root rot was found in all the 114 fields sampled in Sask. in 1943. The disease was slight in 17 fields, moderate in 96 and severe in one. Disease ratings were calculated for the individual fields by the examination of upwards of 100 plants from each field; a histogram (fig. 1) was prepared showing the distribution of the fields according to disease rating. In figs. 2 and 3 are shown similar histograms for 1942 and 1941 respectively. It is apparent that the disease was about as prevalent and severe in 1943 as in 1941; on the other hand, it was considerably more severe in both these years than in 1942. The differences between the mean disease ratings 9.4 and 9.9, in 1943 and 1941, and that of 6.0, in 1942, are highly significant statistically. It should be noted that 1942 was an excellent crop year with moisture generally abundant and with rather low soil temperature. The other two years were characterized by about average wheat crops, with drought conditions present in large areas and with rather high soil temperature at times. (B.J. Sallans)

Common root rot was generally prevalent in the lighter soil districts of Man., but, owing to favourable weather conditions for plant growth in 1943, damage was slight. No severe attacks of common root rot were reported. In general, the disease was less severe than in 1942, and considerably less than in 1941 (F.J. Greaney)

TAKE ALL (Ophiobolus graminis) was observed in 10 fields in Alta. The damage was estimated as slight in 5 fields and moderate in 5 (M.W.C.). Very little take all was noted in Sask. in the districts visited in 1943. The use of rotations and lack of wet conditions seem to be the main factors for its absence (H.W.M.). Take all was not found in Man. in 1943. (F.J. Greaney)

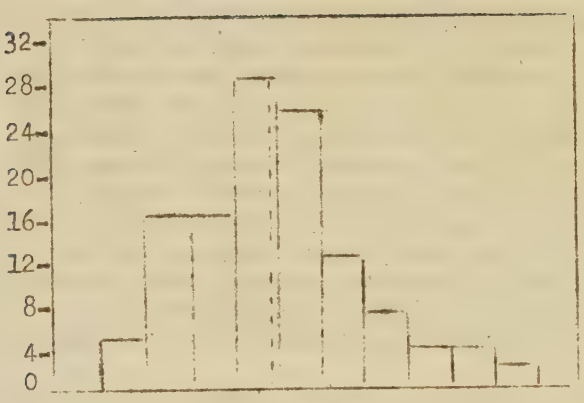
SHARP EYESPOT (Pellicularia filamentosa). On the basis of photographs published by I.D. Blair (Can. Jour. Research 20, Sec. C:174-185. 1942) Mary G. Glynne and Wendy M. Ritchie (Nature 152:161. 1943) conclude that certain Canadian strains of Rhizoctonia Solani, when inoculated into wheat, caused a stem girdling injury that appears to be identical with Sharp Eyespot, first described, according to these authors, by A.J.P. Oort (Tijdschr. over Plantenziekten 42:179-210, and 211-234. 1936).

BASAL GLUME BLOTCH (Pseudomonas atrofaciens). A trace of infection was observed in 3 fields in Alta.

STRIPE RUST (Puccinia glumarum). No stripe rust was found on wheat or barley, but there was a trace to slight infection on Hordeum jubatum at several points in southern Alta.

STEM RUST (Puccinia graminis) was first found at Edmonton, Alta., in mid-July, but it developed slowly and caused no damage owing to the prevailing cool weather. During a survey in central Alta. in late August, stem rust infection was a trace in 7 fields, slight in 8, and moderate in 4. Severe local infections occurred in some of the plots at Edmonton and rust ranged from a trace to moderate in the plots at Lethbridge. (M.W.C.)

Stem rust was first found at Saskatoon, Sask., on Red Bobs on July 27; the rust appeared late and was difficult to find. At Swift Current, stem rust was severe on irrigated land, but only a trace occurred on dry land. Infection was severe on Red Bobs at Shaunavon and moderate at Limerick. The average damage for the province was a trace. (H.W.M.)



Common Root Rot of Wheat
in Saskatchewan

Fig. 1.
1943: 114 fields
Mean disease rate = 9.4
SD = 3.73

Fig. 2.
1942: 192 fields
Mean disease rate = 6.0
SD = 2.59

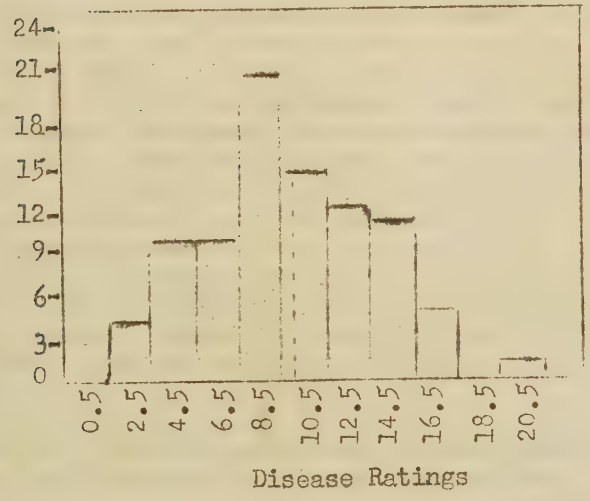


Fig. 3.
1941: 88 fields
Mean disease rate = 9.9
SD = 3.78

Stem rust of wheat was first observed in southern Man. on July 12, in 1943, almost two weeks later than normal. It spread slowly on barley, susceptible wheat varieties, and on susceptible grass hosts, but by the end of the season had spread throughout the province. Practically no stem rust infection occurred on the stem-rust resistant varieties Thatcher, Renown, and Regent. The amount of stem rust on barley, except perhaps in some very late fields, did not exceed 1 or 2% and in some barley fields it was difficult to find rust infections. Practically no wheat varieties susceptible to stem rust are now grown in Manitoba and stem rust, therefore, was rarely found in wheat fields and caused no damage. However, Marquis wheat grown in rod-row plots at Morden and Brandon carried infections of 30% and 15% respectively. Only traces of stem rust occurred on Durum wheat. (B. Peturson)

Stem rust was severe on winter wheat at Guelph, Ont., both in the plots at the Ontario Agricultural College and in the vicinity. (J.D. MacLachlan)

No stem rust was recorded in the variety plots at Ste. Anne de la Pocatière, Que., and Fredericton, N.B. Stem rust was very late in developing in 1943 in P.E.I. Most of the grain was sufficiently mature to escape attack. Late fields, however, were severely infected. In the rust nurseries, stem rust was moderate to severe only at Indian Head, Sask., Morden and Winnipeg, Man., Kapuskasing, Ont., and Kentville, N.S.

LEAF RUST (Puccinia triticina) was severe on Thatcher, Red Bobs and Garnet, moderate on Marquis and N.S. 2489B, slight on Coronation and a trace on Ottawa 1544-30-20 and Regent at the Farm, Agassiz, B.C. (W. Jones). Leaf rust appeared late in the season and did not become prevalent in Alta. A survey in central Alta. in late August showed a trace in 9 fields, slight infection in 6 and moderate in one. Infection was slight in the plots at Edmonton, and ranged from a trace to moderate at Lethbridge (M.W.C.). Some fields heavily infected by leaf rust were seen in the Broadview district, Sask. In general, infection was much less severe than in 1942 (H.W.M.)

Leaf rust of wheat, although somewhat less prevalent than in 1942, was present throughout the whole of the grain-growing area of Man. It made its appearance in the southern part of the province on June 21, almost a week later than normal. It developed rather slowly during the latter part of June and early July owing to the subnormal temperatures which prevailed during that period and to the paucity of air-borne inoculum from the south. The scarcity of inoculum in this area during the early part of the season was due mainly to the steady northerly winds which prevailed in June. In mid-July, when most of the wheat had passed the flowering stage and the kernels were from $\frac{1}{4}$ to $\frac{1}{2}$ formed, only traces of leaf rust were present on from 50 to 90% of the plants of susceptible wheat varieties. However, from then on this rust developed very quickly and by the end of the first week in August average infections in southern Man. ranged from 40 to 60% and in northern Man. from 10 to 25%. (B. Peturson)

Leaf rust was severe on winter wheat in the plots and about Guelph, Ont. (J.D. MacLachlan). Leaf rust infection was severe in the majority of the rust nurseries (q.v.) across Canada.

BROWNING ROOT ROT (Pythium spp.). A survey made in early July in the brown soil area of central Alta. revealed that browning root rot had evidently been prevalent and, in some fields, severe earlier in the season. At the time that the survey was made, however, considerable recovery was noted. The damage was estimated as a trace in 6 fields, slight in 2, moderate in 2, and severe in 3 (G.B. Sanford). Damage was also reported from a field at Berwyn, in the Peace River district. (A.W. Henry)

For the first time in many years Pythium root rot of wheat was definitely more severe in the heavier soils of the Regina plains and the Rosetown area in Sask. than in the darker, but lighter-textured soils north, northeast and east of Saskatoon. As a large number of summer-fallowed fields in the heavy soil areas had been sown to flax this year, there were fewer wheat fields to become diseased. Thus, the loss in the field from browning root rot was lower than it otherwise might have been.

In the areas northeast of Saskatoon, browning root rot was negligible even in areas where it is commonly widespread and more or less severe. Mr. McPhail, superintendent of the Experimental Station, Melfort, stated that, in his experience, this was the first year browning root rot was hardly noticeable in the district. In early June, however, some seedlings collected from fields showing early browning symptoms in east, central, and northeast areas were found to be infested with Pythium in the fine lateral roots of the primary roots. Dry conditions then prevailed and the crown roots were late in forming. They apparently escaped infection when they did form. In the heavier soils areas, on the other hand, better moisture conditions in early June permitted severe infection of the crown roots to occur. In the province as a whole, losses were well below average. (T.C. Vanterpool)

In a survey trip through the southern part of Sask., browning root rot was very noticeable in numerous fields on the Regina plains. It was particularly severe in an area around Riceton and Gray; practically every field of wheat on summer-fallow was affected. The usual field symptoms were clear, especially on slopes and knolls. The disease caused a reduction in tillering and a general unthriftiness, as well as considerable delay in growth. From reports received it was learned that the disease was widespread in the south central part of the province. (H.W.M.)

A severe outbreak of browning root rot occurred in the Gilbert Plains district of Man. in 1943. A high percentage of the wheat fields on summer-fallow in the area extending from Shortdale to Ashville was affected. In late June, the amount of infection in some fields in this area amounted to 80%. The weather conditions of July and August favoured slow but fairly complete recovery, and yields were moderately high. In most fields the degree of root lesioning by Pythium spp. was not severe. However, the disease was not confined to patches but extended throughout the affected fields. Field symptoms indicate a general phosphate deficiency in the soils of the Gilbert Plains area. The extent and severity of the attack can be partly explained by the fact that unusually wet and cool weather prevailed throughout the northern districts of Man. in May and June. Browning root rot was fairly severe in several fields at Ste. Rose du Lac; the disease was also found in a field near Harding, Man. (F.J. Greaney)

GLUME BLOTCH (Septoria nodorum) was found in 40 fields out of 105 examined in Alta.; infection was a trace in 17 fields, slight in 19, and moderate in 4 (M.W.C.). Glume blotch infection varied from a trace to severe in P.E.I. (R.R. Hurst)

SPECKLED LEAF BLOTCH (Septoria nodorum and S. Tritici) was general on all varieties except Garnet in the trial plots at Agassiz, B.C. (W. Jones). The disease was particularly prevalent in the central sections of Alta. Infection was a trace in 5 fields, slight in 40 and moderate in 21 out of 105 examined. It was slight to moderate in the plots at Edmonton and Lacombe, and a trace to slight in those at Olds and Lethbridge. Of the 31 specimens examined microscopically, 8 were affected by S. nodorum, 15 by S. Tritici and 8 by both species (M.W. Cormack). In Man. infection was a trace to slight in 6 fields, moderate in 4 and moderate to severe in one (T. Johnson). Speckled leaf blotch (S. Tritici) was noted occasionally on winter wheat in the plots at the Ontario Agr. College and in fields about Guelph, Ont. (J.D. MacLachlan). S. nodorum was recorded in the rust nursery material (q.v.) from 19 of the 26 localities across Canada, while S. Tritici was found also only at Edmonton and Lacombe, Alta.; the former pathogen caused mostly a trace to light infections, but it was reported as moderate from Kemptville, Ont., Lennoxville, Que., and Charlottetown, P.E.I.

BUNT (Tilletia caries and T. laevis). The usual summary of car inspections for the first quarter of the grain year, 1943-44, was prepared by W. Popp from the records of the Western Inspection Division. It should be noted that much of the grain delivered during this period was of the 1942 crop, and accordingly the summary may be less representative than usual. However, the percentage of cars of both Hard Red Spring and Amber Durum graded smutty is virtually tripled over the previous year; this increase in the amount of smut may be due to seasonal fluctuation, but growers should be warned not to neglect seed treatment.

Table 1. Wheat Bunt in Western Canada

Summary of Inspections from August 1 to October 31, 1943

Class of Wheat	Cars Inspected	Cars Graded Smutty	Percentage Graded Smutty
Hard Red Spring	36,967	89	0.24
Amber Durum	639	13	2.03
White Spring	0	0	0.0
Alberta Red Winter	144	0	0.0
Garnet	8	0	0.0
All Classes	37,767	102	0.27

A trace of bunt was observed in 3 fields out of 105 examined in Alta. (M.W.C.). Bunt was found in 4 fields out of 115 examined in Sask.; 3% of the heads were affected in a field at Tuxford and 5% in one of Red Bobs at Cutknife (H.W.M.). In field tests with naturally-inoculated seed, five times as much

bunt developed in rows sown April 27 as in rows of the same seed sown May 17. Covered smut of barley and the smuts of oats behaved in the opposite way. (R.C. Russell)

LOOSE SMUT (Ustilago Tritici). A trace was present in 5 fields out of 105 examined in Alta. A trace was found in only two fields both of Durum wheat, at Oak Bluff and La Salle, Man. Loose smut occurred occasionally, sometimes in moderate amounts, about Guelph, Ont. (J.D. MacLachlan). Loose smut infection ranged from a trace to 7% in the 21 fields examined in P.E.I.

BLACK CHAFF (Xanthomonas translucens). Out of 28 fields examined in Man., X. translucens f. sp. undulosa and f. sp. cerealis appeared to be about equally prevalent in the 9 affected fields, the average damage varying from a trace to moderate. In 2 fields, at Ste. Rose du Lac and Teulon, a light infection was present on 100% of the plants. Black chaff was also found in collections of rust nursery (q.v.) material from Manotick and Kapuskasing, Ont. In both cases X. translucens f. sp. undulosa was isolated. No bacterial blight of barley or halo blight of oats were found present, but many of the collections were too advanced in maturity for a satisfactory examination of the leaves. It may be noted that with wind-disseminated fungus pathogens, such as rust, the severity and extent of an attack in any locality can be gauged by the examination of relatively small plant populations in the uniform rust nurseries. With bacterial diseases, on the other hand, the distribution of the disease is patchy, and the examination of relatively small populations is of little value, except, in some cases, to give evidence of the presence of the disease. (W.A.F. Hagborg)

OATS

ANTHRACNOSE (Colletotrichum graminicola). Infection was slight in one field near Camrose, Alta., and moderate in the rust nursery (q.v.) at Ste. Anne de la Pocatière, Que.

POWDERY MILDEW (Erysiphe graminis). A slight infection was present on all varieties in the plots at Sidney, B.C., but no mildew was seen at Agassiz (W. Jones). In the rust nurseries powdery mildew was found only on material from Saanichton.

COMMON ROOT ROT (Fusarium spp.) affected 10 fields out of 80 examined in Alta.; damage was a trace in 5 fields, slight in 4, and severe in one near Ramsey.

HEAD BLIGHT (Fusarium sp.). Traces were observed in a field in Queens Co., P.E.I. (R.R. Hurst)

LEAF BLOTCH (Helminthosporium Avenae) was unusually prevalent in central Alta. in 1943. Infection was a trace in 12 fields, slight in 35, moderate in 13 and severe in 2, a total of 62 fields out of 80 examined. Infection varied from a trace to severe in the variety plots at Edmonton and Lacombe, and from a trace to slight at Olds (M.W.C.). All fields inspected in the southern part of the Red River Valley, Man., were affected. This was the most severe infection ever noted in the province (J.E. Machacek). Most

varieties showed a trace to slight infection in the variety plots at Ste. Anne de la Pocatière, Que. (C. Perrault). Leaf blotch was slight to moderate on most varieties at Fredericton, N.B. (S.F. Clarkson). A slight infection was recorded at Billtown, N.S. (R.M. Lewis). Infection varied from a trace to slight in Prince and Queens Counties, P.E.I. (R.R. Hurst). Helminthosporium Avenae was isolated from rust nursery (q.v.) material from Indian Head, Sask., St. Catharines, Ont., Macdonald College, Que., Kentville, N.S., and Charlottetown, P.E.I.

OAT NEMATODE (Heterodera avenae). In the report for 1942 (P.D.S. 22: 9), it was stated that the oat nematode population was on the increase, even though the visible injury from this source was comparatively small. The grain crop got away to a good start and made vigorous growth in 1942. However, this abundant growth also provided an excellent food supply for the nematodes, with the result that the population gave signs of rapid increase during that year (1942). Due to the little visible evidence of field injury one might easily have been lulled into a feeling of false security by assuming that these nematode populations were on the decline. The reverse was the case.

A forecast was made that injury from the attacks of the oat nematode would be heavy in 1943, possibly not quite as heavy as that experienced in 1941, but very much more than in 1942. Drought in 1941 tended to accentuate the damage from this source.

Due to wet spring in 1943 many grain fields were planted late and got off to a delayed start. However, growth should have been rather rapid thereafter due to plenty of sunshine and warmth. In other words the conditions for growth of grain, except for the delay in planting, were not altogether unfavourable. In spite of this the injury to these plants from oat nematode attack was severe. Under conditions of drought last spring there is little doubt but that the injury would have been worse. The net result is that there is now a heavy population of these nematodes which has been building up in the areas of infestation during the last two seasons (1942, 1943). If the spring of 1944 is dry, the danger is very great that injury to the crop in some fields will be very severe to a complete loss. (A.D. Baker)

CROWN RUST (Puccinia coronata) was more prevalent in Sask. in 1943 than for many years, and was reported farther west than usual. Infection was moderate on 100% of the plants of Banner at Saskatoon on August 17. Rhamnus cathartica was moderately infected at Saskatoon on June 27. (H.W.M.)

Owing to very favourable weather conditions for spore germination, and to the presence of an abundance of the black stage of crown rust on the debris of last year's crop, a very heavy aecial infection of crown rust of oats occurred on Rhamnus cathartica in Man. In the Red River Valley, practically every leaf on this shrub carried one or more infections. Fortunately it occurs only in very small numbers in Man. and the few bushes that occur are located mostly in towns and cities and are situated usually a considerable distance from oat fields. Although all the buckthorn bushes in this area were heavily infected, they are so few in number that they could not have had any practical bearing on the crown rust infections which later developed throughout Man., chiefly, no doubt, from air-borne spores from the south. The heaviest crown

rust infections occurred in the south-eastern part of the province and averaged from 20 to 80% intensity of infection with most of the fields carrying infections of less than 40%. The prevalence of the infection gradually diminished towards the north and the west; in the north-western half of the agricultural area of the province, average infections did not exceed 20% in the most severely rusted fields, and in many fields infections averaged less than 5%. (B. Peturson)

Crown rust was exceptionally severe at Guelph, Ont. None of the resistant varieties in the plots at the Ont. Agr. College were free from rust (J.D. MacLachlan). Crown rust was moderate on susceptible varieties in the plots on clay at Ste. Anne de la Pocatière, Que., while only traces occurred on the same varieties sown on sandy soil (C. Perrault). Four varieties of oats sown on June 7 near 36 large bushes of Rhamnus cathartica set out in 1939 for rust studies near Fredericton, N.B., were moderately to severely infected by crown rust; the percentage infection was estimated to be 45% on Ajax, 55% on Vanguard, 70% on Erban, and 100% on Victory. The same varieties sown on May 20, about 400 yards from the alternate hosts, developed only a trace on Victory. Crown rust was singularly light in the plots at Fredericton, N.B. (S.F. Clarkson). The rust was severe in one field at Prospect, N.S. (R.M. Lewis), and was generally heavy on late oats in P.E.I. (R.R. Hurst). In the rust nurseries (q.v.) crown rust was severe at Brandon and Morden, Man., Kapuskasing and Kemptville, Ont., Ste. Anne de la Pocatière, Que. and Fredericton, N.B.

STEM RUST (Puccinia graminis). A slight general infection was reported at Ladner, B.C. (W. Jones). Stem rust was first observed at Edmonton, Alta., on July 11. Although it appeared early and caused severe local infections in the plots at Edmonton, and in a few fields, it was not unusually prevalent late in the season (M.W.C.). Stem rust showed moderate development on late crops of susceptible oats in Sask. In some heavy stands infection was severe. (H.W.M.)

Stem rust of oats was very much more prevalent in Man. this year than it has been for several years past. It appeared in southern Man. early in July and quickly spread throughout the grain growing area of the province. Fields of susceptible oat varieties, particularly late sown ones, became quite heavily infected. Early sown fields of susceptible oats carried stem rust infections averaging from 15 to 35% with only a small percentage of these fields averaging more than 20% in intensity of infection. However, later sown fields carried infections averaging upwards of 40%. For the first time, appreciable infections of stem rust developed on the new stem-rust-resistant oat varieties. These resistant varieties did not become uniformly infected. Generally, quite heavily rusted spots, often limited to a few square feet or yards in area, developed at irregular intervals in fields of these varieties. The irregularity of these rusted spots and their limited extent strongly suggested that they had been initiated by a very light spore shower of some strain of rust capable of infecting these new varieties. Later, this was confirmed by greenhouse tests which showed that races 8 and 10 of stem rust of oats caused these infections. Up to the present year, these races had been of very rare occurrence. The cause of the increase in prevalence of these virulent races is as yet unknown, and no prediction can, at the present time, be made regarding their prevalence in the future. (B. Peturson)

Stem rust was unusually prevalent in the plots at the Ont. Agr. College, Guelph, Ont. and in the neighborhood. None of the resistant varieties were entirely free from infection (J.D. MacLachlan). Bond and Erban sown on June 7 about 100 feet from 24 large bushes of Berberis vulgaris set out for rust studies in 1939 near Fredericton, N.B., showed 75% and 45% infection respectively, on Aug. 18, while Erban sown on May 20, some 400 yards from the same bushes, was free from stem rust (S.F. Clarkson).

Stem rust was almost entirely absent in the variety plots at Ste. Anne de la Pocatière, Que., and Fredericton, N.B. A light infection was reported at Kentville, N.S., and, although many fields were free from rust in P.E.I., infection was very heavy in all late fields. In the rust nurseries (q.v.) rust infection was moderate at Brandon, Morden and Winnipeg, Man., Kapuskasing, Guelph, St. Catharines and Kemptville, Ont., Kentville, N.S., and severe at Fredericton, N.B.

SPECKLED LEAF BLOTCH (Septoria Avenae) was widely distributed on the lower mainland, B.C., and caused slight damage. In the plots at Agassiz, it was more prevalent on Roxton and Ripon than on the other varieties (W. Jones). A trace was recorded at Forrest and Gilbert Plains, Man. (T. Johnson). The disease slightly to moderately infected most varieties at Ste. Anne de la Pocatière, Que. (C. Perrault), and at Fredericton, N.B. (S.F. Clarkson). In the plots at both places, it seemed to be somewhat more prevalent than leaf blotch (q.v.). Only traces were observed in the rust nurseries (T. Johnson). A very slight infection was reported at Charlottetown, P.E.I. (R.R. Hurst)

SMUTS (Loose Smut, Ustilago Avenae, and Covered Smut, U. Kolleri). A slight infection of loose smut was present on several varieties in the plots at Sidney and Agassiz, B.C. (W. Jones). Smut was found in 14 fields out of 80 examined in Alta.; infection was a trace in 7, slight in 3, moderate in 2, and about 20% in 2 (M.W.C.). Covered smut affected a trace to 2% of the heads in 15 fields in Sask., while a slight infection of loose smut was recorded in 3 fields (H.W.M.). In plots sown with naturally-inoculated seed, there was more covered smut in the late than in the early sown rows. The same was true for loose smut, but infection was relatively light even in the early sown rows (R.C. Russell). Smut was recorded in 24 fields out of 35 examined in Man.; the average percentage in infected fields was 4.4% and in all fields 3%, with 12.0% present in a single field (W. Popp). Loose smut was prevalent in the neighborhood of Guelph, Ont., wherever the grain had not been treated; covered smut was much less common. The incidence of the two smuts was about the same as usual (J.D. MacLachlan). In a survey of 25 fields in P.E.I., considerable loose smut was present in each field, the highest infection being 42%. (R.R. Hurst)

HALO BLIGHT (Pseudomonas coronafaciens). Infection was a trace in 2 fields and slight in 9 out of 80 examined in Alta. (M.W.C.). Halo blight was found in 4 fields in southwestern Sask. and in 4 others in central and north-eastern sections (H.W.M.). On June 9, at Saskatoon, about 20% of the plants in the Laboratory plots bore water-soaked lesions on the distal half of the first leaf, and occasionally at the tip of the second leaf. The infection appeared to have originated from the seed (B.J. Sallans). Halo blight

infection was rather severe in a field west of Saskatoon on June 6, and on Banner in the University plots on June 11. It would appear that the hot, dry summers in Sask. are unfavourable for the further advance of the disease. (T.C. Vanterpool)

Only 9 fields were found affected in Man. out of 22 examined, the disease rate ranging from slight to 15%. The low incidence of halo blight in 1943 may be related to the increasing use of halo-blight resistant varieties - Ajax, Exeter and Vanguard (W.A.F. Hagborg). Halo blight was occasionally observed in a few fields in Queens Co., P.E.I. (R.R. Hurst)

BACTERIAL LEAF BLOTCH (organism not specifically determined). A moderate, patchy infection was found in several fields between Edmonton and Leduc, Alta. The disease was severe in one field in the fourth crop of oats after summer-fallow. (W.C. Broadfoot)

Blast (non-parasitic) caused slight damage at the Station, Agassiz, B.C.; it was most prevalent on Laurel 22 in the variety plots (W. Jones). Blast was present in all fields examined in Alta.; a trace in 21 fields, 5% in 28, 10% in 14, and 15-20% in 17. Blast ranged from 5 to 15% in the variety plots at Lacombe and from a trace to 15% at Olds (M.W.C.). Blast was present in every oat field examined in Sask. and caused moderate damage. It was more severe than in 1942 (H.W.M.). Blast was 22-43% in variety plots on sandy soil at Ste. Anne de la Pocatière, Que., but only 4-11% was recorded on the same varieties on clay (C. Perrault). Blast varied from 2 to 25% in the plots at Fredericton, N.B. (S.F. Clarkson). An average of 4% blast was noted in 7 fields examined in Queens Co., P.E.I. (R.R. Hurst)

MAGNESIUM DEFICIENCY was general throughout P.E.I., but the damage was negligible. (R.R. Hurst)

LEAF-TIP BROWNING (phosphate deficiency) was general and severe in the Dauphin, Gilbert Plains and Grandview areas, Man. The trouble retarded an already late crop. Considerable damage was evident. (F.J. Greaney)

WIND DAMAGE. Withered seedlings were sent from Invermay, Sask. on June 23. The oats were sown on June 10, about 2 5/8 inches deep (average of seedlings submitted), and the young seedlings were subjected to a strong wind on June 20. Many seedlings withered off when 2 inches high, but there was some recovery. Two other instances of similar damage to oats have been received previously. Careful inquiry into these two cases led me to believe that the killing off of the seedlings soon after emergence was mainly due to the effects of strong winds, which were unusually warm for the time of year, on seedlings weakened by too deep seeding. Fungus damage was negligible. (T.C. Vanterpool)

BARLEY

ERGOT (Claviceps purpurea). Heads of hooded barley affected by ergot were sent in, on Sept. 12, by Mrs. K. Wood, from the experimental plots at Fort Selkirk, Yukon. The infection was heavy, being 6 to 10 sclerotia per head. This is believed to be the most northerly collection of ergot on barley ever

made in Canada (A.M. Brown and Margaret Newton). About 3% of the heads were affected in a field near Edmonton, Alta. (M.W.C.). A slight infection of ergot was found in 3 fields out of 36 examined in Sask. Infection was very light in the province in spite of the presence of ergots in much of the 1942 seed and, presumably, of ergot bodies introduced into the soil the same year (H.W.M.). A trace of ergot was observed at Sanford, Man. (T. Johnson). Only traces of ergot were found in barley in 1943 in P.E.I., but nearly every field was affected. (R.R. Hurst)

POWDERY MILDEW (Erysiphe graminis) was slight on Hannchen in the plots at Sidney, B.C. (W. Jones), and on Montcalm at Ste. Anne de la Pocatière, Que. (C. Perrault). It was very severe in the plots at the Ontario Agr. College, and in fields in the vicinity of Guelph, Ont. It is the most important barley disease in this area (J.D. MacLachlan). In the rust nurseries (q.v.) it was moderate or severe at Saanichton, B.C., and St. Catharines, Guelph, and Kemptville, Ont. Traces were also reported in P.E.I.

STRIPE (Helminthosporium gramineum) moderately affected O.A.C. 21 in the seed treatment plots at Saskatoon, Sask. Spores of the organism were observed. Formalin failed to control the disease, while Ceresan, Ceresan dip and Leytosan were effective (H.W.M.). A trace of stripe was present in two plots at Brandon, Man. (B. Peturson). It was observed occasionally in the plots at the Ont. Agr. College, Guelph, Ont. (J.D. MacLachlan)

SPOT BLOTCH (Helminthosporium sativum) was a trace in 6 fields, slight in 12 and moderate in 4 out of 43 examined in Alta.; infection ranged from slight to moderate in the variety plots at Edmonton, Lacombe, Olds, and Lethbridge (M.W.C.). A slight infection was noted at Homewood, Man. (F.J. Greaney)

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.) affected 10 fields out of 43 examined in Alta.; the damage was a trace in 1 field, slight in 8, and moderate in one (M.W.C.). The disease was present in all fields examined in Sask.; the damage was slight in 2 fields, moderate in 32 and severe in one. (H.W.M.)

NET BLOTCH (Helminthosporium teres). Infection was a trace in one field, slight in 8, moderate in 2, and severe in one out of 43 examined in Alta. (M.W.C.). Net blotch was found in 14 fields out of 36 examined in Sask.; although it was fairly common, it was not severe (H.W.M.). Net blotch was recorded in 9 fields in Man.; infection was a trace in 2, slight in 3 and moderate in 4 (W.L. Gordon). Infection varied from a trace to severe in the plots on clay at Ste. Anne de la Pocatière, while only traces were noted in the plots on sand. (C. Perrault)

LEAF RUST (Puccinia anomala) was usually slight to moderate in the plots at Agassiz, B.C. (W. Jones). A light general infection of this rust occurred on barley varieties throughout Man. in 1943. The heaviest infections occurred in the southern part of the province and ranged upward of 35% in some fields. Generally, however, infection of leaf rust did not much exceed 5% and only traces of this rust were present in the majority of the fields. It was not quite as prevalent as last year (B. Peturson). Leaf rust was very severe both in the plots at the Ont. Agr. College and in fields about Guelph, Ont.

(J.D. MacLachlan). Traces of leaf rust were present in all late fields in P.E.I. (R.R. Hurst). In the rust nurseries (q.v.) leaf rust was moderate to severe at Winnipeg, Man., and St. Catharines and Guelph, Ont.

STEM RUST (Puccinia graminis) was not observed in any barley fields in Alta.; there was a slight infection late in the season in the plots at Edmonton. Stem rust was very light in Sask., being recorded in 5 out of 36 fields examined. A moderate infection was seen at Kincaid. Stem rust (q.v. on wheat) was very light on barley in Man., except in some very late fields. It was very severe in the plots at the Ont. Agr. College, and in fields of barley about Guelph, Ont. Traces of stem rust were present in all fields of barley examined in P.E.I. In the rust nurseries stem rust was light to moderate at Indian Head, Sask., Brandon and Winnipeg, Man., and Kapuskasing, St. Catharines, Guelph and Ottawa, Ont.

SCALD (Rhynchosporium Secalis) was general in the plots at Sidney, B.C., and was severe on some of the hybrid lines under test (W. Jones). Scald was a trace in 6 fields, slight in 10 and moderate in one out of 43 fields examined in Alta.; infection was slight to moderate in the plots at Edmonton, Lacombe and Olds, and a trace to slight at Lethbridge. (M.W.C.)

LEAF SPOT (Selenophoma Donacis (Pass.) Sprague & Johnson var. stomaticola (Bauml.) Sprague & Johnson). This fungus was observed on diseased barley received from Dodsland, Sask. on Sept. 5, and was determined by R. Sprague (S 1284, DAOM 13227). (R.C. Russell)

SPECKLED LEAF BLOTCH (Septoria Passerinii). Infection was a trace in one field, slight in 2 and moderate in 3 in Alta., and it ranged from slight to moderate in the plots at Edmonton (M.W.C.). A trace was found at Portage la Prairie and Carmen, Man., a slight infection at Ste. Amélie and Woodside and a heavy attack at Gladstone. A trace of Septoria nodorum was also found on barley at Sperling. (T. Johnson)

COVERED SMUT (Ustilago Hordei) affected 10 fields of the 43 examined in Alta.; infection was a trace in 2 fields, slight in 3, about 5% in 4, and about 10% in one (M.W.C.). This smut was recorded in 5 fields out of 36 examined in Sask.; infection was a trace to 1% (H.W.M.). In plot tests, infection from naturally inoculated seed was very light, although it was heavier in late-sown than in early-sown seed. (R.C. Russell)

LOOSE SMUT (Ustilago nigra and U. nuda). In Alta., loose smut (species not determined) was observed in 15 fields out of 43 examined; infection was a trace in 5 fields, slight in 3, about 5% in 4, and 15% in one field near Calgary. There was a trace to slight infection on Newal at Edmonton, Lacombe, and Lethbridge; a trace also occurred on most of the other varieties at Lacombe (M.W.C.). In Sask., loose smut (mostly due to U. nuda) affected 19 fields out of 36 examined; infection was usually a trace to 3%, but in one field at Spiritwood, 12% of the heads were affected. A slight infection also occurred on Prospect and Newal at Saskatoon. (H.W.M.)

Smut, including covered smut, was found in 33 fields out of 37 examined in Man. U. nigra was definitely determined from 5 fields, and mixed infections of U. nigra and U. nuda were obtained from 3; the species present in the other

25 fields was not determined. The highest percentages of smut in individual fields were, U. nigra, 18%; U. nuda, 8%; species undetermined, 30%. (W. Popp and W.L. Gordon)

Collections of loose smut were made from all agronomic districts of Que.; 147 collections were germinated on potato dextrose agar using the technique of Tapke. Eighty-eight collections (59.9%) yielded Ustilago nuda, 55 collections (37.4%) yielded U. nigra and the remaining 4 collections (2.7%) proved to be a mixture of the two species (R.O. Lachance). Traces of loose smut were found in all fields examined in P.E.I. (R.R. Hurst)

BACTERIAL BLIGHT (Xanthomonas translucens f. sp. hordei-avenae) was not found in 8 fields of barley examined in Man. The single positive record was made at Winnipeg, in the plots, where a moderate, natural infection occurred. (W.A.F. Hagborg)

FALSE STRIPE (non-parasitic) affected a few plants of an unknown variety at Saskatoon, Sask. (H.W. Mead). A trace of false stripe was present at Rosenfeld, Man., and a slight to moderate infection in several plots at Morden. (B. Peturson)

HEAD BLIGHT (cause undetermined). A slight infection was recorded on Wisconsin 38 at Ste. Amélie, Man. (T. Johnson)

RYE

ERGOT (Claviceps purpurea) infection was slight in 2 fields, moderate in one and severe in one in the 4 fields examined in Alta. In the last field, at Minburn, about 50% of the heads were affected. There was a slight infection in the plots at Lethbridge. Ergot infection was generally lighter in Sask. in 1943 than in the previous year. Infection was light at Saskatoon, moderate at Cutknife and severe in Volunteer rye at Kennedy. A slight infection was reported from Medford, N.S.

POWDERY MILDEW (Erysiphe graminis) was general and abundant on young plants of winter rye on Sept. 20, at the Botanical Garden, Montreal, Que. (J.E. Jacques)

LEAF RUST (Puccinia secalina) was general on all varieties in the plots at Agassiz, B.C., and caused slight damage (W. Jones). Leaf rust was a trace in one field and slight in a second in Alta.; a trace to slight infection was also present in the plots at Lacombe (M.W.C.). A light sprinkling of leaf rust was present on rye in Man. during 1943 (B. Peturson). Young plants of winter rye were already moderately rusted on Sept. 20 at the Botanical Garden, Montreal, Que. (J.E. Jacques)

SCALD (Rhynchosporium Secalis) was fairly general on all varieties in the plots at Agassiz, B.C.; the damage was slight (W. Jones). A slight infection was recorded in one field in Alta. (M.W.C.)

SPECKLED LEAF BLOTCH (Septoria Secalis). Infection was slight in one field in Alta. and a trace to slight in the plots at Lacombe.

TABLE 2 - Pathogenic fungi found present on wheat, oats, and barley grown at 26 localities in Canada in 1943

Locality	Wheat								Oats							Barley		
	P. graminis tritici	P. triticina	S. nodorum	S. tritici	Fusarium spp. (Scab)	H. sativum x	E. graminis	Melanism (on Apex, Renown, etc.) xx	P. graminis avenae	P. coronata avenae	P. avenae	S. avenae x	H. avenae x	C. graminicola	E. graminis	P. graminis	P. anomala	E. graminis
Saanichton, B.C.	0	4	0	0	0	-	3	1	0	0	0	-	0	1		0	1	3
Smithers, B.C.	0	0	0	0	0	-	2	1	0	0	0	-	0	0		0	0	0
Agassiz, B.C.	0	4	2	0	0	-	1	4	1	0	1	-	0	0		0	1	1
Creston, B.C.	1	4	1	0	0	-	0	1	0	0	0	-	0	0		1	2	1
Beaverlodge, Alta.	0	0	1	0	0	-	1	1	0	0	0	-	0	0		0	0	0
Edmonton, Alta.	0	1	2	1	0	-	4	1	0	0	1	-	0	0		0	0	0
Lacombe, Alta.	0	2	1	1	0	-	2	0	0	0	0	-	0	0		0	0	1
Lethbridge, Alta.	0	0	0	0	0	-	3	1	0	0	0	-	0	0		0	0	0
Scott, Sask.	1	1	0	0	0	-	0	0	0	0	0	-	0	0		0	0	0
Melfort, Sask.	1	2	0	0	0	-	0	0	1	0	0	-	0	0		1	1	0
Indian Head, Sask.	3	4	2	0	0	-	0	1	2	1	0	1	0	0		2	1	0
Brandon, Man.	2	4	2	0	0	-	-	1	3	4	0	-	0	0		2	1	-
Winnipeg, Man.	4	4	2	0	0	-	0	1	3	2	0	-	0	0		3	3	1
Morden, Man.	3	4	2	0	0	1	-	2	3	4	0	-	0	0		-	2	-
Kapuskasing, Ont.	3	4	2	0	1	-	0	3	3	4	1	-	0	0		2	2	0
St. Catharines, Ont.	2	4	0	0	1	-	1	1	1	2	0	1	0	0		2	4	3
Guelph, Ont.	2	4	3	0	0	-	0	3	3	1	0	-	0	0		2	3	4
Kemptville, Ont.	2	4	2	0	0	-	0	1	3	4	0	-	0	0		1	1	4
Manotick, Ont.	2	4	2	0	1	-	-	2	-	-	0	-	0	0		-	-	-
Ottawa, Ont.	0	4	2	0	0	1	1	3	1	1	0	-	0	0		2	1	2
Macdonald College, Que.	2	4	2	0	2	1	0	3	1	1	1	1	0	0		0	1	1
Lennoxville, Que.	1	4	3	0	1	1	0	3	2	2	0	-	3	0		1	0	1
Ste. Anne de la Pocatière, Que.	2	4	2	0	1	-	0	2	2	4	0	-	0	0		1	0	0
Fredericton, N.B.	1	1	0	0	1	-	0	2	4	4	0	-	0	0		1	0	0
Kentville, N.S.	3	4	2	0	1	-	0	3	3	2	0	1	0	0		1	1	0
Charlottetown, P.E.I.	2	1	3	0	0	-	0	2	1	1	1	1	0	0		0	0	0

x Evidence of presence obtained through isolation studies.
xx Melanism of heads and internodes - confined to derivatives of Hope and H 44 and probably induced by more than one agency.

Explanatory note:
0 = none; 1 = trace; 2 = light; 3 = moderate;
4 = severe; - = plants not examined for presence of organism

SURVEY OF RUST NURSERY MATERIAL FOR PLANT DISEASES IN 1943

In table 2 are given the result of examination of material from 26 uniform rust nurseries scattered across Canada. The examination was made by members of the Winnipeg Laboratory and the table was prepared by one of them, Dr. T. Johnson.

Thirteen varieties of wheat, nine of oats and three of barley were grown in these nurseries. The varieties were as follows: Wheat - Apex, R.L. 226 (Marquis x Kanred), McMurachy, Regent R.L. 975.6, C.T. 141 (R.L. 704 x Ma), R.L. 1183 (Iumillo x Mindum), Little Club, Marquis, Renown R.L. 716.5, Spelmar, Thatcher, Vernal, Norka; oats - Bond, Erban, Sevnothree, Trispernia, Ajax, Vanguard, White Russian, S-811, R.L. 1228 (Victoria x 524); barley - Goldfoil, Heil's Hanna, and Plush.

The nurseries were sown at the end of the seeding period at each Station and were harvested early, while the plants were still green or when they were beginning to turn colour. Accordingly, it is probable that few diseases had an opportunity to reach their maximum development. Readings for each disease were made on all varieties and separate tables were prepared for the rusts. Since these tables only go to emphasize the level of development at any particular Station, these detailed tables are omitted and only Table 2 with its figures representing the severity of each disease on the more susceptible varieties for each Station is shown.

II. DISEASES OF FORAGE AND FIBRE CROPS

ALFALFA

BLACK STEM (Ascochyta imperfecta). Slight to moderate infection was observed in 8 fields in Alta. in August. Infection was slight in the plots at Lethbridge, and slight on the stems and moderate on the leaves in those at Edmonton (M.W.C.). Alfalfa plants received from Pas Trail in the Melfort district, Sask., showed small black spots on the sepals, pedicels and pods; Ascochyta ?imperfecta was present (H.W.M.). Black stem was present on certain strains in the plots at Swift Current (T.C. Vanterpool). A severe general infection was present on alfalfa at Pleasant Home, Man. (J.H. Craigie)

BACTERIAL WILT (Corynebacterium insidiosum). In a large proportion of the alfalfa fields in the Kamloops district, many plants died, due to winter killing in the severe winter of 1942-43. Examination revealed that bacterial wilt occurred in the fields showing winter killing and was affecting a large proportion of the plants (G.E. Woolliams). Bacterial wilt was found in 86 out of 125 stands of alfalfa examined in the southern irrigated districts of Alta. in June. It occurred in all the 80 stands three years old or older, and the damage in 1943 was estimated to be a trace in 11% of these fields, slight in 41%, moderate in 34% and severe in 14%. A trace of damage was found in 6 of the 45 young stands examined, and the early stages of infection were detected in several others. Severe damage occurred in a four-year-old variety plot of Autogamous at the Station, Lethbridge. In the two-year-old variety plots the damage was a trace to slight in Autogamous and a trace in all other varieties except Ladak, in which no infection was found. The disease was observed for the first time on non-irrigated land in Alta., in the Clover Bar district east of Edmonton. Damage ranging from a trace to moderate was present in 4 out of 30 fields examined in late September. It was not observed early in the season and apparently became established and developed rapidly as a result of the abnormally wet weather of the past two seasons. (M.W. Cormack)

DOWNY MILDEW (Peronospora aestivalis) infection was a trace to slight on Grimm and other hardy varieties in the plots at Edmonton, Alta., and moderate on all non-hardy varieties except Argentine, which was severely affected. (M.W. Cormack)

YELLOW LEAF BLOTCH (Pseudopeziza Jonesii) was quite general in one field of Grimm at the Station, Summerland, B.C. (G.E. Woolliams)

COMMON LEAF SPOT (Pseudopeziza Medicaginis) was fairly general on Vancouver Island and the lower mainland, B.C.; considerable defoliation resulted (W. Jones). A slight to moderate infection was found in 10 fields in Alta. in August. The disease appeared unusually early in the plots at Edmonton and caused considerable damage before the first cut of hay. Infection was slight in the plots at Lacombe and Olds (M.W.C.). Infection was general and slight at Morden, Man., while it was relatively heavy at Sanford (W.L. Gordon). Common leaf spot was prevalent in the Guelph area, Ont, (J.D. MacLachlan). A severe attack of this leaf spot caused a premature yellowing at the Botanical Garden,

Montreal, Que. (J.E. Jacques). Common leaf spot was heavy in 4 fields and traces in all others examined in P.E.I. (R.R. Hurst). A slight infection was found at Starrs Point, N.S., on black medick, Medicago lupulina. (R.M. Lewis)

LEAF SPOT (Pseudoplea Trifolii). A slight infection was recorded in the University plots, Vancouver, B.C. (W. Jones). For previous reports see P.D.S. 22:18.

ROOT ROT (Rhizoctonia Solani). Odd plants were found affected at Brandon, Man., while 10% of the plants were killed or dying at Morden. (J.H. Craigie)

Sclerotia of Sclerotinia sclerotiorum were found in a sample of alfalfa seed received by the Laboratory at Saskatoon, Sask. (S 1291; DAOM 14042). The sclerotia were cultured and the fungus determined by J.W. Groves. (R.C. Russell)

LEAF SPOT (Stemphylium ? botryosum) was fairly general on alfalfa, but caused very slight damage on the lower mainland, B.C. (W. Jones)

CROWN ROT (a low-temperature basidiomycete). Crown rot or true winter killing, either singly or in combination, caused very severe damage in alfalfa stands in the central and northern areas of Alta. The percentage of damaged fields is given for the different districts in Table 3.

Table 3. Percentage of alfalfa fields damaged by crown rot and winter killing in Alta. in 1943.

District	Fields Examined	Crown Rot	True Winter Killing	Combined Crown Rot and Winter Killing
Northern	58	26%	38%	36%
Central	48	60	8	32
Southern	125	13	17	
All Alta.	231	26%	20%	16%

In north-central and northern Alta., damage was found in all alfalfa fields examined, of which about 40% were completely killed out or were so severely damaged as to be worthless. In another 20%, nearly half of the plants were killed, and in the remainder there was slight to moderate damage. If this area is considered as a whole, true winter killing was the most important. In the Athabaska district, there was very little snow cover in January, during extremely severe weather, and approximately 90% of the alfalfa was killed. The situation in the Peace River district was reported to be similar. Severe killing also occurred in other forage crops, and even in the native pastures. Crown rot patches were usually evident in protected locations where the alfalfa had not been winter-killed. In the central areas, south of Westlock, a heavy snow cover remained throughout the winter and the fairly general killing of alfalfa on hillsides occured apparently during a period of low temperature, after growth started in the spring. Crown rot was unusually prevalent in these central areas and caused moderate to severe damage in many fields. Later in the season some of the

less severely affected stands made a fair recovery as a result of the extremely favourable growing conditions. In southern Alta., crown rot was less prevalent than in 1942, and in most fields it caused only a trace to slight damage. Winter killing was fairly severe in a local area north of Brooks, but was absent in other southern districts. (M.W. Cormack)

MOSAIC (Medicago virus 2). A trace of mosaic was found in the plots at Fredericton, N.B. (D.J. MacLeod)

WITCHES' BROOM (virus) was found affecting at least 5% of the plants in a field at Armstrong, B.C. A survey of adjacent fields was not made (G.E. Woolliams). Slight damage was found in a field near Cherhill, Alta.; there was a slight increase in damage in the affected plots (P.D.S. 22:19) at Edmonton. (M.W. Cormack)

YELLOW TOP (boron deficiency) was general in one field in P.E.I. Some of the affected plants developed leaf-like petals in addition to the yellow chlorosis in the top of the plant. The purple coloration described by some workers was absent. (R.R. Hurst)

COMMON CLOVER

SOOTY BLOTCH (Cymadothea Trifolii). A fairly general infection occurred on red clover on the lower mainland and Vancouver Island, B.C., and caused slight to moderate damage (W. Jones). Traces of the disease were present in all red clover fields examined in P.E.I. (R.R. Hurst)

POWDERY MILDEW (Erysiphe Polygoni) was severe on red clover in the plots at Lethbridge, Alta., and slight at Edmonton. It was generally prevalent at Guelph, Ont. Traces were present in all red clover fields examined in P.E.I.

LEAF SPOT (Stagonospora recedens) was fairly general on the lower mainland, B.C., and caused considerable damage in some fields. (W. Jones)

RUST (Uromyces Trifolii) was general and severe on stems and leaves of red clover in the plots at Agassiz, B.C. (W. Jones). The rust was heavy on the leaves of red clover at the Botanical Garden, Montreal, Que. (J.E. Jacques). Rust infection was a trace to heavy in P.E.I. causing severe damage in some fields. (R.R. Hurst)

SWEET CLOVER

ROOT ROT (Cylindrocarpon Ehrenbergi, etc.). Slight to moderate damage occurred in the variety plots at Edmonton, Alta. (M.W. Cormack)

LEAF SPOT and STEM BLIGHT (Leptosphaeria pratensis (Stagonospora Meliloti). A slight infection was found in 2 fields in Alta. and in the plots at Lacombe (M.W.C.). Stem blight was severe in certain lines in the nursery of the Dominion Forage Crops Laboratory, Saskatoon, Sask. (T.C. Vanterpool). A slight infection was observed on scattered plants at Winnipeg, Man. (J. E. Machacek)

ROOT ROT (Phytophthora Cactorum). A trace to slight damage was found in 2 fields and in many roadside stands in southern Alta.; about 10% of the plants were dying in one field near Millicent. (M.W. Cormack)

LEAF SPOT (Pseudopeziza Meliloti). A trace was present on the leaves of some seed plants at Morden, Man., on Sept. 1. (W.L. Gordon)

ROOT ROT (Rhizoctonia Solani). Odd plants were found affected at Brandon, Man. on June 24. (J.H. Craigie)

ROOT ROT (Sclerotinia sativa Drayton & Groves) caused slight damage in the Alpha variety at Lacombe, Alta., and moderate to severe damage in the plots at Edmonton (M.W. Cormack). This Sclerotinia was first recognized as a distinct pathogen in the root rot complex of alfalfa and sweet clover in Alta. by Dr. Cormack about 1933. Almost at the same time it was realized that the organism was possibly an undescribed species. The same organism was encountered by Drayton on tulips and once on narcissus. The perefect state was developed in culture and has now been described (F.L. Drayton and J.W. Groves, Mycologia 35: 517-528. 1943). Up to the present this root rot on sweet clover and alfalfa has been recognized only in Alta. and Sask.

LUPINE

POWDERY MILDEW (Erysiphe Polygoni). A moderate infection occurred in a planting of field lupines at Edmonton, Alta. This appears to be a new host record for Alberta . (A.W. Henry)

BUCKWHEAT

YELLOWS (Callistephus virus 1) was common on the rough Fagopyron tataricum varieties in Carleton, York, Sunbury, Albert, Westmorland and Kings Counties, N.B.; infection ranged from 8 to 12%. A trace was found on Silver Hull in York Co. (D.J. MacLeod). An occasional plant of Silver Hull was affected by yellows in P.E.I. (R.R. Hurst)

CORN

EAR, STALK and ROOT ROTS (Diplodia Zeae, Fusarium moniliforme, Gibberella Saubinetii, Nigrospora sphaerica). On open-pollinated varieties and commercial hybrids, Gibberella Saubinetii and Diplodia Zeae were the only important ear-rot pathogens in Essex and Kent Counties, Ont., in 1943. Infection by these two organisms was closely correlated with injury by ear worm and corn borer. (A.A. Hildebrand)

SMUT (Ustilago Zeae). A trace of smut was present in the plots at Fredericton, N.B. and a diseased specimen was received from Sussex (D.J. MacLeod). Smut was seen occasionally on fodder corn in Queens Co., P.E.I. (R.R. Hurst)

FLAX

The following account on the "Flax Diseases in Saskatchewan in 1943" was prepared by Professor T. C. Vanterpool, University of Saskatchewan, Saskatoon, Sask.

SEEDLING BLIGHT (Rhizoctonia Solani). Contrary to the findings of the previous season, seedling blight caused considerable thinning out of flax stands in 1943, and thus in many districts also contributed indirectly to losses caused by weeds. In all, 43 flax fields were examined carefully for seedling blight in the northeast, east-central, central and west-central parts of the province during June. In these 43 fields, seedling blight was estimated as severe or moderate in 40%, as slight or a trace in 44% and as causing no damage in the other 16%. It seems legitimate to infer that in the 40% where the disease was severe or moderate, the crowding out of flax by weed growth was considerably enhanced by the reduction of the stand by blight. Isolations were made from blighted seedlings from ten fields and in all instances Rhizoctonia Solani predominated, with occasional cultures of Pythium de Baryanum, Fusarium Scirpi var. acuminatum, F. Equiseti, F. avenaceum and F. oxysporum f. Lini. The evidence this year indicates that Rhizoctonia seedling blight is more severe on flax following fallow than on flax or cereal stubble. More observations are necessary to settle this point.

RUST (Melampsora Lini) was again severe in Sask., though in general the loss was not as great as in 1942. Drier conditions in many districts slowed down its development and spread, and in only a relatively few districts did it reach epidemic proportions comparable to last year. Infection was again heaviest on Bison, ranging from slight to severe. Many fields of Royal were encountered in which little or no rust could be found. However, occasional fields of this variety were seen where a moderate infection of 25-30% was present. In a small area in one field of Bison showing a 50-60% rust infection, many plants were found practically free from rust. When these clean plants were pulled and hand threshed, they yielded the characteristic seed of Royal. On the basis of the rust reaction, nearly every one of the Royal plants in the admixture could be separated from the Bison plants. The susceptible Bison is no longer recommended for Saskatchewan. On the other hand, the acreage of Royal increased considerably this year. At the present time, it is anticipated that future losses from flax rust will be slight.

STEM CANKER (Melampsora Lini and Fusarium spp.) was again present in many fields of Bison late in the season; it was not as severe as in 1942. The Fusarium spp. present were identified as F. Scirpi var. acuminatum and F. avenaceum by Dr. W. L. Gordon.

WILT (Fusarium oxysporum f. Lini) was found in fields at Conquest (5%), Watrous (15%), and Young (20%) in Sask. The variety being grown in each field was the wilt-susceptible Crown. Ninety per cent of the isolates from Crown seedlings grown in samples of these 3 soils were F. oxysporum f. Lini; the other 10% were mainly F. Equiseti, Rhizoctonia Solani and Pythium de Baryanum.

STEM BREAK and BROWNING (Polyspora Lini). Lesions were conspicuous on the cotyledons in many fields during the survey in June. This situation was not unexpected, as the seed from the 1942 crop was known to carry a large amount of infection. Of the 96 samples of seed that were plated out, 42% showed a trace to moderate infection with Polyspora Lini. Further progress of the disease including

a weakening of the stem at the cotyledonary node was probably retarded by dry atmospheric conditions. Traces of the stem-break stage were found at several scattered points, but 20-30% of the stems were broken in two fields of Royal. Those two fields were sown in 1942 to Bison, which had suffered heavily from both phases of the disease. A heavy wind storm in the preceeding week was considered by the grower to have increased the stem break. It is probable that neglect of crop rotation, etc., is responsible for the high incidence of P. Lini on much of the flax seed in the province, particularly on Bison. Moreover, unless seed treatment of flax becomes widespread, and proper crop rotation and other hygienic practices are carried out, there is every reason to believe that Royal seed will become as generally infected as Bison is now. Royal is now recommended to be grown in most districts and Bison to be discontinued.

In the variety plots at the University, Saskatoon, the browning phase of the disease was late in developing, as it first appeared within a fortnight of harvest in most varieties. The direct damage would be considered as negligible, but the development of the browning phase, even at such a late date, means that the seed for next year's crop becomes infected. This explains why stem break has been reported from Sask. for many years, and yet both the stem break and browning phases were conspicuous and moderately destructive in widely separated localities only in the cool wet summer of 1942.

Polyspora Lini was readily isolated from over-wintered stubble affected by stem break and browning from the plots at Saskatoon. It emphasizes the necessity of crop rotation and the inadvisability of using flax as a nurse crop. Stubble affected by stem break and browning or rust would act as a source of inoculum for neighboring fields.

PASMO (Septoria linicola) has not yet been detected during field surveys in Sask. A careful search for it was made Aug. 9-10 in the southern parts of Sask. without success.

LATE ROOT ROT (Fusarium spp., etc.) was rarely of any consequence in 1943. Drought possibly interfered with the development of clear-cut symptoms.

BOLL LESIONING (hail). Many fields in the southern part of Sask. showed 10 to 20% of the bolls discoloured or lesioned during the second week in August. The discolorations or lesions were somewhat lighter in colour than those typical of browning. The injury was suspected to be due to hail. Bolls from 9 fields were selected and 154 seeds taken from the discoloured bolls were plated on potato dextrose agar. No growth occurred or Alternaria spp. developed from the majority, but 9 seeds from 5 different fields yielded Polyspora Lini. This supports the view that the discoloration was due to slight hail injury. Seed plated out in a similar manner, from bolls affected with browning last year, yielded over 75% of P. Lini. Flax appears to be considerably less susceptible to hail damage than the cereals.

HEAT CANKER (non-parasitic). Typical heat canker damage was found in June on plants about 4 in. tall in a field with a southern slope at the north end of a large slough. The field was protected from cool northerly winds by the rising land to the north. Practically all the damaged seedlings were on the southern exposure of the ridges formed by the drills. Damage was as high

as 15% in a few portions of the drill rows, but it was only 2-3% in the field as a whole. Two other fields showing hoat canker were encountered in July, but the trouble was complicated by root rot.

SPERGON INJURY (cf. Journ. Am. Soc. Agron. 35:733-737. 1943) was observed on Bison in March in a greenhouse test on the effects of various chemicals when used as seed disinfectants for flax. The randomized spergon-treated rows could readily be picked out from the others.

CHLOROTIC DIE-BACK (cf. H.H. Flor. Journ. Am. Soc. Agron. 35:259-270. 1943) was observed at one end of a 1/100 acre plot of Bison at the University, Saskatoon. The changes of leaf colour were as described by Flor. Soil reaction was pH 8.0 plus in the affected area and pH 7.0 in the normal areas. The reduction in yield was estimated as slight to moderate.

Other Observations

HEAF BLIGHT (Botrytis cinerea, etc.) was severe in a field of Gossamer at St. Pamphile, Que. Dark brown discolorations were present on the bolls which often extended down to the main stem destroying the seeds and fibre. Botrytis was consistently isolated from diseased parts of the affeted plants. In association, were Alternaria, Cladosporium and other, undetermined fungi. (A. Payette)

WILT (Fusarium Lini). A trace of wilt was found in a field at High River, Alta. (W.C. Broadfoot). Wilt was severe on Crown and light on Royal, Redwing and Bison in the wilt-sick plot at Saskatoon, Sask. (H.W.M.) One plot of Liral was almost completely destroyed by wilt in the variety plots at Ste. Anne de la Pocatiere, Que. The plot was located in a slight depression. Other replicates of the same variety were unaffected. A light infection was present in neighboring plots of Cirrus and Gossamer, which were on a higher level (A. Payette). Wilt was also severe in one field of Cirrus at Ste. Anne. Isolations from seed samples from this district revealed the presence of this organism in 2 samples. (C.Perrault

RUST (Melampsora Lini) infection was a trace in 2 fields in the central part of Alta., slight in 5, moderate in 4, and severe in one, located at Alliance. The only variety affected in the plots at Lacombe was Bison. No rust was found in southern Alta. (M.W.C.) Rust first appeared in Sask. about the middle of June, on seedlings of all varieties. In the Craik area, fields of Bison showing 60% infection were seen. In the Ricetown area at the same time, a light infection was present on Royal. Dry weather, however, delayed rust development with the result that infection was in general not severe when flax began to ripen. Isolated cases of a 20% infection were reported on Royal. Infection was light on irrigated fields at Swift Current, and severe at Dafoe and Oakshela. (H.W.M.)

In 1943, flax rust was first observed in Man. at Winnipeg, on June 10. On that date, young aecial infections were observed on volunteer flax plants growing in flax stubble. From this it would appear that discharge of flax rust sporidia occurred about the first of June. Frequent examination and testing of rusted stubble from then on showed that discharge of sporidia occurred whenever conditions were favourable until June 19. Temperature and moisture conditions were favourable for the development of flax rust during the latter part of June

and it had spread on susceptible varieties throughout Man. by the end of that month. Flax rust, however, developed rather slowly during July and early August owing to the exceptionally high temperatures which prevailed during that period. In general, rust infections averaged from 5 to 15% on Bison and Redwing. In a small percentage of the fields of Bison rust infections averaged upwards of 50%. Only traces of rust occurred on Royal and no rust at all was observed on Viking (B. Peturson). A sample of rusted flax was received from Soulange Co., Que. (R.O. Lachance)

STEM BREAK and BROWNING (Polyspora Lini). Infection was a trace in 3 fields and slight in 3 out of 27 examined in Alta. It also ranged from a trace to moderate in the plots at Lethbridge (W.C. Broadfoot). Stem break moderately infected Bison at Saskatoon, Sask. (H.W.M.)

SEEDLING BLIGHT and ROOT ROT (Rhizoctonia Solani). Seedling blight caused moderate damage at Gray, Sask., and slight injury at Swift Current and Admiral; it was also reported from the Rosetown area (H.W.M.). Root rot was reported in Man. : severe infection occurred on some varieties in the plots at Morden with many plants killed; 30% of plants were infected at Deloraine and 40% at Whitewater, while a trace occurred at Starbuck (W.L.G.). As a damping-off and wilt, the pathogen was severe on some plants in the plots at Winnipeg. (J.E. Machacek)

PASMO (Septoria linocola) was found in 11 fields out of 12 examined in the Haywood and St. Claude areas in Man. Infection ranged from a trace to 50% with an average infection of 12% (M. Newton). A slight infection was also found on Royal at Morden. (W.L. Gordon)

HEAT CANKER (non-parasitic) caused a trace, 5% and 10% damage in 3 fields in southern Alta. (W.C. Broadfoot)

TERMINAL BUD INJURY (cause unknown). The terminal buds of plants were white and dead in a Royal selection in the plots at Saskatoon, Sask. The plants stooled out more than usual and were ragged in appearance. Later examination revealed that plants had made a fair recovery, but the crop was late. (H.W.M.)

FOXTAIL MILLET

SMUT (Ustilago Crameri) was observed in the experimental plots only at Saskatoon, Sask. (T.C. Vanterpool)

GOLDENROD

RUST (Coleosporium Solidaginis and C. delicatulum Hedgc. & Long) was epidemic in the goldenrod plots in the Arboretum, Ottawa, Ont., and caused extensive defoliation of the more seriously affected species. Coleosporium Solidaginis was well established in the plots and the amounts of rust recorded on each species are probably reliable indices of their relative susceptibilty, at least to the predominant local race or races. Some species believed to be here reported rusted from the first time are indicated by an (n). Two species showed a necrotic resistant reaction indicated by an asterisk (*) and two showed

small pustules containing a few spores but no necrosis (**).

The hosts and percentages of the rust were as follows: Solidago altissima L. 10% on most plants, up to 50% on a few; S. caesia L. 50%; S. canadensis L. 10%; S. gigantea Ait. 60%; S. gigantea var. leiophylla Fern. (n) 60-75%; S. glomerata (n) 5%; S. lepida DC. (n) 15%; S. lepida var. elongata (Nutt.) Fern.(n) 15%; S. lepida var. fallax Fern. 15%**; S. mollis Bartl. 20%; S. puberula Nutt. nil; S. racemosa Greene var. Gillmani (Gray) Fern. (n) trace*; S. Riddellii Frank (n) 10%; S. rigida L. (n) 10-100%; S. rugosa Mill. trace; S. sempervirens L. (S. glaberrima Martens 10%*; S. missouriensis Nutt. trace, S. sempervirons as det. 10%); S. Shortii T. & G. (n) 15%**; S. speciosa Nutt. 75%.

The amount of rust on the Euthamia spp. cannot be considered as an index of their susceptibility, since C. delicatulum was first discovered in the district this year and did not reach these plots until late in the summer. Traces of C. delicatulum were found on Euthamia camporum Greene and E. Nuttallii Greene, but no rust was present on E. caroliniana (L.) Greene. (D.B.O. Savile and I.L. Conners)

KOK-SAGHYZ

BLOSSOM BLIGHT (Botrytis sp., cinerea type) was reported causing considerable damage to kok-saghyz at the Experimental Farm, Agassiz, B.C. on June 2 by M.E. Clarke. "This condition is increasing rapidly as a result of cold wet weather" Affected flowers "rarely mature properly, but tend to ripen before being developed fully." The same fungus was isolated from rotted root-cuttings at Ottawa, Ont. Cultures of these two isolates were similar. (F.L. Drayton)

ROOT ROT (Fusarium sp.) affected less than 0.5% of the plants in the plot at Kentville, N.S. A species of Fusarium was the dominant isolate from the affected tissue. (J.F. Hockey)

ROOT-KNOT NEMATODE (Heterodera marioni) was found in a plant at Ottawa, Ont.; it was also observed at Toronto. (A.D. Baker)

RUST (Puccinia Hieracii). A trace of rust was found in the plots at Lethbridge, Alta. (W.C. Broadfoot). Plants of kok-saghyz were successfully inoculated, in the spring, with P. Hieracii, in the Laboratory greenhouse, Winnipeg, Man., using urediniospores from the common dandelion. Plants with dentate leaves without exception bore uredinia, although not as freely as the common dandelion, but plants having entire leaves showed, in general, only infection flecks (A.M. Brown). A moderate infection was seen on Aug. 2, on a few plants of kok-saghyz growing close to a rusted common dandelion in a plot in the Arboretum, Ottawa, Ont. The pustules were small, but without marginal discoloration. Accordingly this host is fairly congenial. Contrary to Brown's observations, both plants with entire and those with dentate leaves were affected. In the fall two adjacent clones in a bed in the Arboretum became heavily rusted, while the others remained free, but it is not clear whether differences in susceptibility were involved. In Oct. rust appeared in the greenhouse on T. laevigatum (Willd.) DC., T. ceratophorum (Led.) DC., T. latilobum DC., and three unnamed plants. It persisted until late December and then gradually disappeared. (D.B.O. Savile). Rust was found on a few leaves in the planting at Kentville, N.S. (J.F. Hockey)

WILT (Sclerotinia sclerotiorum) affected a few plants in the 1942 planting at Kentville, N.S. in June. The pathogen was isolated and sclerotia were observed among the wilted leaves. (J.F. Hockey)

BACTERIAL LEAF SPOT (Xanthomonas sp.). No further reports of this leaf spot, observed at Winnipeg, Man., in 1942, have been received, but attention is drawn to the work of J.S. Niederhauser (Phytopathology 33:959-961), who has described a severe leaf spot and blight on kok-saghyz, observed in a test plot at Ithaca, N.Y. in Sept. 1942. The pathogen is described as Xanthomonas taraxaci n. sp.

YELLOWS (Callistephus virus 1). A trace of yellows was found in the plot at Fredericton, N.B. (D.J. MacLeod). Yellows was the most prevalent disease of kok-saghyz at Kentville, N.S., in 1943. Infection varied from 0 to 12% and averaged about 1%. All affected plants were rogued out late in the season. (J.F. Hockey)

CROWN ROT (cause undetermined). A few scattered plants in the plots at Lethbridge, Alta., were nearly rotted off near the crowns. A dark-coloured fungus was consistently isolated from this material, but has not fruited in culture.

MILKWEED

LEAF SPOT (Cercospora clavata (Gerard)Cooke). A moderate infection was present on the leaves of some plants of Asclepias syriaca L. at Morden, Man. on Sept. 1. The spores were 32-145 x 5-6 microns, longer than usual (W.L. Gordon). This leaf spot was also present in the Ottawa district, Ont., on A. syriaca and A. incarnata. The first collection was made on A. incarnata on Aug. 18 in the milkweed plots of the Division of Botany and Plant Pathology at Deakin's farm by H. A. Senn (DAOM 13789). The disease was heavy on A. syriaca in the same plots in September. There was also a moderate infection on current year's seedlings in a 5-acre field on the Caldwell farm, Central Experimental Farm (DAOM 13785); it caused slight damage, but as the leaves were not being stripped from the young plants, the disease may be destructive next year on account of the plentiful inoculum provided by the old leaves. Heavily infected wild plants were collected at Sand Point (DAOM 13783) by H. Groh. Pycnidia, containing microconidia, and perithecial initials were abundant among the conidiophore fascicles on the older, blackened, shrivelled leaves. It was also collected on wild plants at Uplands (DAOM 13784). Further, a collection was made on A. incarnata f. albiflora Heller in the Arboretum plots, Sept. 25 (DAOM 13782).

Parts of both collections on A. incarnata and one on A. syriaca were sent to Dr. Chas. Chupp, who identified the pathogen as C. clavata. If the characters used by Chupp in his key of the Cercosporae on Asclepias (in litt) are brought together, Cercospora clavata may be characterized as follows: spots on leaves usually indistinct, fruiting effuse, hypophyllous (where spots distinct, amphigenous); conidiophores pale to medium in colour, mostly not in dense fascicles, sometimes branched, 4-6 x 15-60(80) microns; conidia coloured, cylindro-obclavate rounded or obconic at base, 4-6 x 20-100 microns, mostly 20-60 microns. The Cercospora on A. incranata has been described as an independent species, C. incarnata Ell. & Ev., but Chupp has concluded, as the

result of these and other collections, that it is identical with the older C. clavata.

This leaf spot appears to be one of the most common and widely distributed diseases of milkweed. In the early stages the fungus forms a velvety growth, delimited somewhat by the veins, completely covering angular areas on the lower leaf surface with a paling of the corresponding areas on the upper surface. In fact, the symptoms are more suggestive of a leaf mould than a leaf spot. (I.L. Conners and D.B.O. Savile)

RUST (Uromyces Asclepiadis Cooke). A few pustules of rust were collected in the plots of milkweed (Asclepias syriaca) at the Ontario Agr. College, Guelph, Ont., on Oct. 5, 1943, by S. Martin. Nearly all the pustules were telia with a few urediniospores present, but one uredinium was seen. A few stems of swamp milkweed (A. incarnata) were collected Sept. 21 at Tilbury by David A. Arnott (DAOM 14008). The material was heavily infected, but this was the only time rust was observed, although several hundred pounds of leaves had been collected by the same person. Only teliospores were observed in mounts from the telia.

Uromyces Asclepiadis is the only rust of any consequence on milkweed. It is known throughout the eastern half of the United States reaching Canada in southern Ontario; it also occurs in Bermuda, the West Indies, Central and South America. Only uredinia and telia are known. According to Arthur (Manual Rusts in U.S. and Canada p. 324. 1934), "Some collections from the warm regions of the southern border of the United States and southward often have the appearance of a systemic aecial development, but no pycnia can be found ..... In northern regions the drawn chlorotic appearance of young shoots has not been seen, and urodia are not as abundant as telia, both of which occur late in the season."

Other Ontario collections in the Herbarium are: on A. incarnata, London, Ont., J. Dearness (Can. Fungi 171, in part and Seym. & Earle, Ec. Fungi 330); on A. syriaca, London, J. Dearness (Can.Fungi 171, in part); St. Catharines, I.L. Conners (DAOM 667); New Glasgow, I.L.C. (DAOM 14).

The rust was successfully cultured on potted plants with abundant development of uredinia from material collected in Pennsylvania by W. W. Thurston, Jr., but the culture was afterwards lost.

It is believed that Uromyces Asclepiadis does not overwinter in the uredinial stage throughout the northern part of its range, but the milkweed becomes re-infected from urediniospores blown up from the south, for the rust has never been detected before August in Ont. The role of the teliospores has yet to be demonstrated. U. Asclepiadis may become fairly abundant on the host as the specimens in the herbarium indicate, but it seems unlikely that it would become destructive in Ont. (I.L. Conners)

YELLOWS (Callistephus virus 1). A virus disease of the common milkweed, Asclepias syriaca, was observed in the Ottawa district, Ont. as early as 1930 (DAOM un-numbered). The individual shoots are dwarfed to less than half their normal height and fail to develop an inflorescence. Usually several thin shoots arise together, due to several buds developing close to each other on the old rhizome. The leaves are pale, the green colour disappearing most rapidly from the lamina; they are small and acutely pointed.

Attempts to transmit the virus by sap inoculation to healthy cucumber and milkweed failed completely, although a fine carborundum powder was used as an abrasive. On the other hand, the virus of cucumber mosaic was successfully transmitted from Echinocystis and Aquelegia to cucumber using the same technique. From the symptoms and the failure to transmit the virus by sap inoculation, it may be concluded that the disease is not cucumber mosaic, which, however, is known to occur on Asclepias syriaca (Doolittle and Walker, Jour. Agr. Res. 31:1-58. 1925). For the present this virus disease is tentatively considered aster yellows, which has not been reported on A. syriaca, but for which Kunkel (Am. Jour. Botany 13: 646-705. 1926) found A. nivea a relatively susceptible host. (D.B.O. Savile)

SAFFLOWER

LEAF SPOT (Macrosporium (Alternaria) Carthami Rodighin). A severe infection was observed on some leaves of safflower (J.E. Machacek and J.H. Craigie). This is the first report of the pathogen in Canada.

SEEDLING BLIGHT (Botrytis sp., cinerea type) heavily infected and caused severe damage to seedlings of two lines, S 1047 and S 1055, sown in flats in the greenhouse, Arboretum, Ottawa, Ont., in May. Emergence was far less than in 7 other lines sown in the same soil at the same time. Botrytis fruited abundantly on the soil, the achene coats, and the injured seedlings. Later, additional seed of S 1047 was planted in pots in the greenhouse and outside in a garden on the same day. Only 2 seedlings emerged from about 50 seed in the pots, where the soil was continuously wet, but about 30 healthy seedlings appeared in the garden, where soil moisture was generally much lower, out of about 60 seeds. (D.B.O. Savile)

RUST (Puccinia Carthami). A slight general infection was observed in the plots at Lethbridge, Alta., in early September. No rust was found in a 10-acre planting at Barons (M.W.C.) Pycnia were noted on the cotyledons of safflower seedlings on June 28 at Winnipeg, Man. The pycnia are small. The seed had been obtained from Morden and both urediniospores and teliospores were present on the seed (A. M. Brown) A moderate infection of the rust was general at Morden in August (W. Sackston)

When fragments of overwintered, rusted safflower leaves were added to the soil just above safflower seed sown in flats in the greenhouse, Arboretum, Ottawa, Ont., in May, about 30 pycnial infections were obtained on the cotyledons and hypocotyls of 14 seedlings. The pycnia were extremely small and were virtually invisible when the minute drop of nectar was removed. That the pycnia are functional is indicated by the fact that two pycnial infections on plants in the writer's garden remained sterile and that a belated infection in the original experiment, which developed after all other pycnia had dried up, remained sterile for a month and then promptly developed uredinia when diploidized with nectar from newly-produced pycnia.

The pycnia are followed by uredinia, or mixed uredinia and telia. On two occasions, when inoculations were made from fresh uredinia that were mixed with telia, further pycnia were produced. It should also be noted that the two groups of pycnia that occurred in the garden must have come from spores in the seed sample, which had been stored at room temperature. Thus it appears not only

that the teliospores of the rust can germinate without previous exposure to freezing temperatures, as might be expected of a subtropical species, but that some of them can germinate within a few days after maturing. P. Carthami is a brachy-form with a tendency toward short-cycling, but is still heterothallic. It may also be noted that P. Carthami is capable of infecting the corn flower, Centaurea Cyanus, forming small pustules within large flecks. (D.B.O. Savile)

SORGHUM

BACTERIAL LEAF SPOT (Pseudomonas syringae) infection was severe and general on the leaves of sorghum at Morden, Man. (W.L. Gordon). Infection was not heavy, but general on Early Amber sorghum in the Botanical Garden, Montreal, Que. (J.E. Jacques)

SMUT (Sphacelotheca Sorghi) infected 5% of the plants in a field at Morden, Man. (W.L. Gordon)

SOYBEAN

The account below on "Soybean Diseases in Southwestern Ontario in 1943" was prepared by Drs. L.W. Koch and A.A. Hildebrand, Dominion Laboratory of Plant Pathology, Harrow, Ont.

The diseases of soybeans encountered during the 1943 growing season in laboratory experimental plots, in Station plantings and in commercial stands throughout Kent and Essex Co., Ont., are recorded in descending order of importance, with pertinent comments on each, as follows:

FUSARIUM BLIGHT (Fusarium oxysporum Schl. f. tracheiphilum Snyder & Hansen)noted first in the laboratory plots on July 6, reached a peak in the district about mid-July and, in general, was more destructive than any other disease encountered during 1943. While most infected plants died, others that later recovered showed for a time foliar symptoms not unlike those exhibited by mosaic-infected plants. Specimens showing most clearly the typical, salmon-coloured spore masses of the causal organism on the stems were to be found more readily among plants infected later in the season. In plots planted with diseased and with healthy seed, respectively, the incidence of blight was in the ratio of 185 to 3, thus furnishing strong circumstantial evidence of the seed-borne nature, as yet unproved, of the pathogen.

POD and STEM BLIGHT (Diaporthe Phaseolorum (Cke. & Ell.) Sacc. var. Sojae (Lehm.) Wehmeyer) first noted on August 14, was well established in the district by August 24 and reached the peak of its destructiveness early in September. In 1941 the disease made its appearance much earlier in the season, photographs of severely infected areas having been obtained as early as July 10.

DOWNY MILDEW (Peronospora manshurica (Naoum.) Syd.). On June 23, twenty-six days after the seeding date, downy mildew was noted in the laboratory experimental plots that had been planted with healthy and diseased seed and with seed that had been treated with Fermate, Arasan and Spergon. Counts were made not only

of the number of affected plants in the various plots but also of the number of lesions on the leaves of each affected plant. The results of the count, on a strictly comparable basis, are as follows:

Kind, or Treatment, of Seed	Number Affected Plants	Number Lesions Present
Spergon	0	0
Select Healthy	2	2
Arasan	2	8
Fermate	6	7
Ordinary Commercial	44	71
Select Diseased	326	724

The relatively high incidence of mildew on plants originating from diseased seed would point strongly to the fact that the pathogen is seed-borne. Since plants originating from Spergon-, Arasan-, and Fermate-treated seed showed lower incidence of mildew than ordinary, non-treated commercial seed, apparently these disinfectants were effective in reducing the disease. Since plants grown from seed selected as healthy were virtually free from the disease, careful seed selection can be highly efficaceous in controlling the disease.

At the time the counts were made, most of the plants were in the 5 leaf stage. It was noted that almost invariably mildew infection was confined to leaflets of the third-formed leaf. Thus infection seemed to be correlated in some way either with the ontogony of the plant or with some set of environmental conditions that pertained when the plants had reached that particular stage of development. Two other interesting points in regard to mildew infection were these: (1) that in the case of certain plants, infection instead of producing the more typical scattered spots on the leaf, involved the whole under-leaf surface, producing symptoms of the mottle type that could easily be mistaken for mosaic; (2) that at the time the counts were taken, the disease was found only in plantings the rows of which ran east and west and, indeed, so far as individual plots were concerned, there was a preponderance of mildew in the rows towards the south. These various circumstances suggest that some infection at least may have resulted from inoculum carried by south-west winds which prevail in the district, thus forming an interesting parallel with infection of tobacco with downy mildew.

The phenomena described above were observed on the variety A.K. Harrow, which is more susceptible to mildew infection than any other variety grown in Kent or Essex Counties.

PHYLLOSTICTA LEAF SPOT (Phyllosticta sojaecola Massl.). Early in July, when the soybeans were about five weeks old, the older leaves of many plants in the experimental plots showed evidence of a serious leaf spot condition. Examination of the round or oval, sometimes irregular, dark to olive brown spots revealed the presence of a Phyllosticta species which morphologically conforms closely with Phyllosticta sojaecola as described by K. Boning: (Phyllosticta-Fleckenkrankheit der Sojabohne. Prakt. Bl. Pflanzenb., 16 (7-8): 168-172. 1938). Inspection of Station plantings and of commercial plantings in the district showed that the disease had reached epidemic proportions and that due to the presence of necrotic tissue, leaves of affected plants suffered much more extensive wind-injur

than did those of non-infected plants. In 1940, Phyllosticta ?phaseolina Sacc. (P.D.S. 20:25) was reported from British Columbia as affecting a few leaves of soybean. The present report, however, is apparently the first to record the occurrence in Canada at least of a Phyllosticta in epiphytotic proportions.

MOSAIC (virus). Neither in the experimental plots nor in commercial plantings was mosaic an important limiting factor in production. However, apparently three different types of the disease were encountered:

Type 1 - Common Mosaic. Plants more or less stunted and remaining green after most healthy plants have shed their leaves; younger leaves puckered or blistered along the veins, older leaves (especially on variety Manchu) showing areas of brownish or bronzed net-veining.

Type 2 - Leaf Roll. Plants spindly and more stunted than in common mosaic; older leaves very deep green in colour; younger leaves narrowed and rolled; veins noticeably cleared.

Type 3 - Gray Fleck or Ring Spot. Plants of an infected group may or may not be stunted. A striking symptom is a mottle on the leaves caused by a gray flecking, with flecks in some instances forming a distinct ring. This type was observed on a Station planting of A.K. Harrow. R.W. Samson (U.S. Plant Disease Reporter 26: 382. 1942) and R.C. Baines (U.S. Plant Disease Reporter 27: 512. 1943) have reported a disease on soybeans that appears to be similar to that caused by the tobacco ring-spot virus.

Whether or not the symptom pictures described above are due to different viruses, to different strains of the same virus or to inherent varietal or strain differences in the host is not known, and it is felt that the mosaic-complex in soybeans is in need of considerable clarification.

FROG-EYE (Cercospora sojina Hara). On August 25, reddish-brown to blackish-brown, more or less elongated lesions were noted on the stems of plants in the laboratory experimental plots. Specimens were collected and upon examination it was found that a species of Cercospora was fruiting on the characteristic lesions on the stems. In spore size, septation and other characteristics, the conidia of the fungus agree with those of Cercospora daizu Miura (= C. sojina Hara), the causal organism of frog-eye disease. Later in August and during September, the disease affected large numbers of plants both in the experimental plots and in commercial plantings of the district. This is the first reported occurrence of this disease on soybeans in Canada. L.J. Tyler (U.S.Pl. Dis. Reporter 27 (20): 507. 1943) has recently indicated that the correct name for the organism causing frog-eye leaf spot is C. sojina Hara of which C. daizu Miura is a synonym. According to Dr. Chupp (in litt), the original description was published in Nogyo Sekai Tokyo 9:28. 1915. Although he has not seen it, he has compared authentic material received from Dr. Hara with the material which Lehman described in Carolina. Since C. sojina was described first, it is the accepted name.

BROWN SPOT (Septoria glycines Hemmi). On September 22, attention was attracted to certain plants in the experimental plots, the stalks of which showed areas with a distinctly silvery sheen. These silver-coloured areas were thickly covered with the fruiting bodies of a fungus. Microscopic examination revealed

species of Septoria and the pycnidia and spores agree in size, etc., with those described for Septoria glycines Hemmi. Brown spot, like frog-eye, apparently has not heretofore been reported in Canada.

BACTERIAL BLIGHT (Pseudomonas glycinea (Coerper) Stapp). Bacterial leaf spots, like mosaic, were a negligible factor in the district this year. In June, in two commercial plantings, up to 40% of plants, then 8 to 10 in. tall, were infected. Later in the season the disease disappeared in these two plantings, and apparently had no effect on yield.

ANTHRACNOSE (Colletotrichum Glycines Hori). On leaf petioles of diseased plants collected on August 23, anthracnose was noted for the first time this season. Subsequently the disease was noted on late-collected specimens.

ASCOCHYTA and ALTERNARIA sp. At various times throughout the season, Ascochyta (cf., below) and Alternaria were found fruiting on lesions on leaves, in a manner which suggested that they might possess primary parasitic capability.

Other Observations

LEAF SPOT (Ascochyta sp.). A slight infection was observed on a few plants at the Station, Agassiz, B.C. (W. Jones). A moderate infection was recorded at the Station, Kentville, N.S. (G.W. Hope). Material from both places was examined. In the Agassiz material (DAOM 14079), the spores were 6.0-9.0 x 2.0-3.5 microns, the larger spores being 1-septate and this is probably the same fungus as reported in 1942 (P.D.S. 22:29). In the Kentville material (14078), the pycnidia were about 150 microns diam., with large ostiole, spores 4.5-9.0 x 2.5-3.5 microns - the smaller mostly continuous, cylindric to broadly ellipsoid, the larger mainly 1-septate, cylindric or irregular, straight or curved, sometimes slightly constricted at the septum, which is not always visible, except under the 2 mm. objective. These specimens were examined by A. A. Hildebrand, who points out that this Ascochyta from B.C. and N.S. is quite distinct from that found at Harrow, Ont. In the Ont. material, according to him, the spores average 13.0 x 2.8-3.0 microns, and the septum shows distinctly. A prepared slide showed these differences clearly. (I.L. Conners and D.B.O. Savile)

BACTERIAL BLIGHT (Pseudomonas glycinea) was reported as follows: Infection slight to moderate in the variety plots at Lethbridge and Olds, Alta. severe on Manitoba Brown at Brooks, and a trace on Blackeye at Lacombe (M.W.C.); slight to moderate in a field of several acres and on Sioux in the plots at Morden, Man., slight in a 20-acre field at Homewood (W.L. Gordon); moderate in the plots at Kentville, N.S. (G.W. Hope)

MOSAIC (virus) occurred in various amounts in the plots at Agassiz, B.C. (W. Jones)

CHLOROSIS (excess lime) was severe on Sioux at Fort Whyte, Man. (J.E. Machacek)

SUDAN GRASS

BLOTCH (Helminthosporium turcicum Pass.). Affected leaves of Sudan grass were collected by R.C. Branbury, Agricultural Representative, on the farm of S.A. Montgomery, Hilton, Ont., Sept. 7, 1943, det. J. D. MacLachlan (O.A.C. 724, DAOM 4063). While the occurrence of H. turcicum is reported on Sudan grass (A.B. Seymour, Host Index p. 87. 1929), Drechsler (Jour. Agr. Res. 24:716) restricts H. turcicum to corn and contends that "a critical comparative study of the forms of Helminthosporium on Johnson grass and various types of sorghum will be necessary, before their identity with the corn leaf blight can be regarded as definitely established."

BACTERIAL LEAF SPOT (Pseudomonas syringae van Hall, Bijdr. Kennis Bakt. Plantenziekte. Inaug. Dissert. Amsterdam. 1902). A moderate infection was observed at the Botanical Garden, Montreal, Que. (J.E. Jacques)

MANGEL

CROWN GALL (Agrobacterium tumefaciens). A number of affected roots was brought to the Laboratory, Charlottetown, P.E.I. (R.R. Hurst)

LEAF SPOT (Cercospora beticola) was unusually heavy in the variety test plots, Division of Forage Crops, Central Exp. Farm, Ottawa, Ont. Tip Top was the most resistant variety. Although all the leaves of Frontenac, Prince and Giant White Sugar were affected, these varieties showed some resistance, while all other varieties were heavily diseased (Div. of Forage Crops). This leaf spot was generally prevalent on mangels and sugar beets at Guelph, Ont. (J.D. MacLachlan). A slight infection was observed on the inflorescence of seed plants of Frontenac in the Montreal district, Que., in Aug.; damage was negligible (R.O. Lachance). At the Station, Kentville, N.S., 2-40% of the plants were affected on Aug. 24, while 98-100% showed leaf spot on Oct. 1. Good control was obtained early in the season by treatment of the seed with Arasan (J.F. Hockey). Leaf spot was heavy in a field of Frontenac in Queens Co., P.E.I. The primary pathogen is unknown; only Alternaria, determined as A. tenuis by J.W. Groves, was found on the spots. (R.R. Hurst)

LEAF SPOT (Phoma Betae) was fairly general on the foliage of seed plants at the Farm, Agassiz, B.C.

ROOT ROT (several organisms including Phoma Betae) caused considerable damage to seedlings and young stecklings at Agassiz. It affected 25% of the seed plants of Sludstoup variety in the plots at the University, Vancouver, B.C. Roots were partly to wholly decayed. (W. Jones)

LEAF SPOT (Ramularia beticola) was general in a seed crop of Long Red and caused moderate damage to the foliage at Dewdney, B.C.

MOSAIC (virus) affected 20% of the plants of Sludstoup grown for seed at the University, Vancouver, B.C. (W. Jones). A trace was observed in fields of Frontenac being grown for seed in the Montreal district, Que. (R.O. Lachance). A trace of mosaic (Beta virus 2) was found in a plot at the Station, Fredericton, N. B. (D.J. MacLeod)

BLACK HEART (boron deficiency). An occasional root was affected in many fields in P.E.I. (R.R. Hurst)

BLACK ROOT (cause ?) affected and caused the death of 50% of the plants in the variety plots at Ste. Anne de la Pocatiere, Que. This disease resembles closely the disease known as black root described on sugar beets. (R.O. Lachance)

FASCIATION (cause unknown). A trace was observed in the plots at Fredericton, N.B. (D.J. MacLeod). An average of 6% of plants was affected in several fields in P.E.I. (R.R. Hurst)

SUGAR BEET

The account below on "Diseases of Sugar Beets in Southerwestern Ontario in 1943" was contributed by Dr. A. A. Hildebrand, Dominion Laboratory of Plant Pathology, Harrow, Ont.

Due (1) to continued unfavourable weather conditions which greatly extended the planting season, (2) to the use, for the first time, of segmented seed by a considerable number of growers and (3) to severe outbreaks of black-root among seedlings of later plantings, the sugar-beet fields of Southwestern Ontario presented a more variable picture than for a number of years past. As in preceding seasons, incidence of disease contributed to reduction in yield and quality.

BLACK ROOT (various fungi). In Southwestern Ont. the planting of sugar beets is usually almost completed by the end of May. This year, however, planting of over 60% of the acreage devoted to this crop was delayed by wet weather, until well on into June, some fields being seeded as late as June 20. In many of the later-planted fields, incidence of black root was especially severe and resulted in complete loss of about 6% of the total acreage planted.

CERCOSPORA LEAF SPOT (C. beticola). This season, for the first time in many years, Cercospora leaf spot was relatively unimportant as a factor limiting production, this being due to the fact that, as a result of general late-planting and mid-season drought, the foliage of beet plants had not reached the physiological stage of maturity necessary for infection, when, in mid-season, fungous inoculum was available.

RHIZOCTONIA ROT (R. Solani). This root disease was of almost general occurrence throughout the district, and in a few cases, caused losses up to 10% of the stand. In the aggregate, however, total loss of yield would not exceed 4%.

HEART ROT (boron deficiency). Probably as the result of continued dry weather later in the growing season, boron deficiency symptoms became apparent on sugar beets growing in the light, marl soil of the Blackwell area near Sarnia.

LEAF MOTTLES. For the past three years, a fine and a coarse mottle of the leaves of sugar beets have been under observation and investigation. That they are of the nature of a virus has been greatly discounted by the fact that

all attempts to transmit them by insects and by grafting have failed. This year some evidence was obtained that they may be of the nature of nutritional disorders correlated with soil type. Near Wallaceburg, Ontario, there is an almost abrupt line of demarcation between soils of two different series, one a Clyde silt loam, the other a Brookston clay. During surveys carried out this summer, it was noted that the mottles were present in abundance on plants growing in the Clyde loam, but were practically non-existent on those in neighbouring fields of the Brookston clay.

Other Observations

ROOT-KNOT NEMATODE (Heterodera marioni) was again found attacking sugar beets this year in the Blackwell district of Sarnia Twp, Ont., and was more injurious and numerous than in 1942. An apparently popular host of the nematode was the common burdock, Arctium minus (Hill) Bernh. The identification of the host was confirmed by Dr. H.A. Senn. The plant appears to be a new host for the root-knot nematode in Canada. (A.D. Baker)

SUGAR-BEET NEMATODE (Heterodera schachtii). New areas in which the sugar-beet nematode was located in 1943 in the Blackwell district of Sarnia Twp., Ont., slightly extended the regions known to be affected, but these areas all lie within the boundaries of the "precautionary area" previously established. In general, infection and injury were heavier in 1943 than in 1942. The presence of considerable numbers of gravid females of the nematode on the roots of curled dock, Rumex crispus L., in the same district indicated that the sugar-beet nematode is capable of completing its development on this plant. The identification of the host was confirmed by Mr. E.W. Hart. This is a new host for H. schachtii in Canada. (A.D. Baker)

LEAF SPOT and BLIGHT (Phoma Betae) was fairly general in April on new leaves of seed roots overwintered in the field at the Station, Sidney, B.C. Small to large brown areas occur on the lamina as well as necrosis and browning of the veins. Pycnidia were abundant. (W. Jones)

LEAF SPOT (Ramularia beticola) was general on seed crops in the Fraser Valley and at the Station, Sidney, B.C. It occurred on the leaf blades, petioles and stems and often on the flower pedicels. It was prevalent on the young foliage of overwintered seed roots in April at Sidney, (W. Jones)

RUST (Uromyces Betae). A light sprinkling of rust occurred on the leaves in mid April at the Station, Sidney, B.C. It was not observed on seed crops on the Lower Mainland. (W. Jones)

DAMPING OFF (cause undetermined). Severe damage was reported in the spring from one field at Raymond, Alta. (W.C. Broadfoot)

HOLLOW CROWN (cause unknown). A splitting of the crowns was prevalent, followed by the formation of hollow pockets at Giroux, Man. (J.E. Machacek)

LEAF SCORCH. Leaves punctured by hail were badly "scorched" at Portage la Prairie, Man. The large lesions were due to Alternaria, Cephalosporium and bacteria. (J.E. Machacek)

SUNFLOWER

MOULD (Botrytis cinerea and Sclerotinia sclerotiorum). The growth of mould caused slight damage to the heads of sunflower in the plots at Saskatoon, Sask. (H.W.M.). A head blight due to Botrytis cinerea was severe on a few heads in the Laboratory plots, Winnipeg, Man. (J.E. Machacek)

POWDERY MILDEW (Erysiphe Cichoracearum). The lower leaves of a few plants were lightly spotted with the oidial stage on August 27 in the plots of the Division of Forage Plants, Central Exp. Farm, Ottawa, Ont. (D.B.O. Savile)

DOWNY MILDEW (Plasmopara Halstedii) was destructive at the Station, Kapuskasing, Ont. J.P.S. Ballantyne, Superintendent, (in litt) stated that "In one plot where sunflowers are a continuous crop, last year an occasional plant, (under) 1% of the stand, was affected, but this year at least 75% are diseased. On other plants in rotations with other crops, the occasional plant was diseased last year and this year the condition was worse... The worst infection (this year) is on plots that were seeded quite early, but where sunflowers are grown continuously. Seeding was delayed 7-10 days. Following seeding we had a cool, wet month." The importance of soil infection was clearly demonstrate by Makota Nishimura (Jour. Coll. Agr. Hokkaido Imp. Univ. 9(3):185-210. 1922 and 17(1):1-61. 1926). (I.L. Conners)

Downy mildew was already severe when the plots of the Division of Forage Plants, Central Exp. Farm, Ottawa, were examined on Aug. 4. At least one third of the plants were affected and about half of these were completely useless. Severely affected plants had the internodes reduced to 1 in. or less and formed small heads or none at all. These severely injured plants were all about 18 in. high, whether the normal plants of the strain were tall (10 ft.) or short (3 ft.) or belonged to lines of intermediate height. (D.B.O. Savile)

RUST (Puccinia Helianthi) caused severe damage at Borden, Sask., in a field which was adjacent to one heavily rusted in 1942 according to W.J. White. The plants apparently became inoculated from rusted volunteer plants in the latter field or directly from the stubble. The rust was absent or a trace only in 7 other fields. A field sown with the same seed, 30 miles away, was free from rust (T.C. Vanterpool and P.M. Simmonds). A moderate infection occurred on some plants at Morden, Man. (W.L. Gordon)

Only a trace of rust was present in the plots of the Division of Forage Plants, Central Exp. Farm, Ottawa, Ont., on Aug. 4. The rust, however, developed rapidly, infection varying from slight to severe on Aug. 27, but it probably caused little damage. (D.B.O. Savile)

WILT (Sclerotinia sclerotiorum) caused slight damage in a planting at Flatbush, Alta. At Lacombe, where the disease was destructive in 1942 (P.D. S. 22:34), the sunflowers were planted in a new location and only a trace of damage occurred in both Mennonite and Sunrise (M.W.C.) Stem rot was reported by W.J. White from Borden and Wynyard, Sask., and the pathogen was isolated; however, the disease was not found in 7 other fields examined (T.C. Vanterpool). A small amount of wilt was found in the plots at Saskatoon and diseased specimens were received from Melfort, where it was reported to be severe (H.W.M.)

Infection was a trace at Morden, Man. (W.L. Gordon) and slight to moderate in the Winnipeg area. (A.M. Brown)

LEAF SPOT (Septoria Helianthi). Infection was slight on all varieties and strains at Lethbridge, Alta.; a trace on Mennonite and a slight infection on Sunrise was recorded at Lacombe, Alta. (W.C. Broadfoot). Quite a heavy infection was found on one leaf of a plant received from Kapuskasing, Ont.; the general situation is unknown. (I.L. Conners)

BORON DEFICIENCY was severe in a few lines of sunflower in the plots, Division of Forage Plants, C.E.F., Ottawa, Ont. on Aug. 4; most of the heads were stunted and had the appearance of being "frozen", the involucral bracts of the small unopened heads being blackened. Other symptoms were the extreme brittleness of the involucral bracts, and also of other parts of the plant and lumpiness and cracking of the petioles and rarely of the stems. A yellow spotting followed by a necrotic spotting of the lower leaves was most severe in the lines showing the most serious head and petiole symptoms and may be an additional symptom. The head symptoms have been observed in greenhouse cultures in both the Division of Horticulture and the Division of Forage Plants, but not the petiole cracking. A little of the lumpiness may have been due to tarnished plant bugs, which were present in small numbers, but most of it was definitely correlated with the head symptoms. Mr. F. Nowasad points out the variations in severity may be correlated with the types of root systems of the selections in question, rather than their boron requirements. Stem cracking as a symptom is mentioned by C.E. Schuster and R.E. Stephenson (Sunflower as an indicator plant of boron deficiency in soils. Jour. Amer. Soc. Agron. 32:607-621. 1940). (D.B.O. Savile)

CULTIVATED GRASSES

AGROPYRON - Wheat Grass

Leaf Spot (Ascochyta graminicola). Slight infection on A. Smithii at Oak Bluff, Man. (T. Johnson)

Ergot (Claviceps purpurea) was slight to moderate on A. cristatum, occasionally heavy on A. desertorum, slight on A. glaucum, A. Michnoi, a trace on A. junceum in the grass plots at Morden, Man. (W.L. Gordon). A severe infection was recorded on A. repens at Carman, Man. (J.E. Machacek), and a trace in A. trachycaulum in a field at Viking, Alta.

Powdery Mildew (Erysiphe graminis). Trace to heavy infection was present on July 22, on A. repens in P.E.I. (Bruce McLaren)

Leaf Blotch (Helminthosporium Tritici-repentis). A slight infection was noted at Winnipeg on June 22 and at Winkler on July 6 on A. repens. The tips of the leaves turned brownish-yellow and then completely withered. This is the first record in Man. on this host. (J.E. Machacek)

Crown Rust (Puccinia coronata) became moderately severe on A. repens and A. trachycaulum in the Laboratory plots, Winnipeg, Man. Both uredinia and telia were present on A. repens, which is a new host for Man. (A.M. Brown and T. Johnson)

Leaf Rust (Puccinia montanensis), A moderate to heavy infection on A. trachycaulum in the grass plots at Morden, Man. (W.L. Gordon)

Scald (Rhynchosporium Secalis) was common on A. repens along roadsides at Cloverdale, B.C. (W. Jones)

Brown Stripe (Scolecotrichum graminis). Slight infection in a field of A. trachycaulum at Viking, Alta. (M. W. Cormack)

BROMUS - Bromo Grass

Bacterial Blotch (undetermined). One large patch of infected plants of B. inermis was found on the bank of the Red River, at Winnipeg, Man. Brownish-black elongated blotches or streaks were formed on the leaves. Bacteria oozed from the veins when the infected areas were sectioned. (J.E. Machacek)

Ergot (Claviceps purpurea). A trace on B. erectus was present in the plots at Morden, Man. (W.L. Gordon)

Leaf Blotch (Helminthosporium Bromi). Infection was severe in patches on B. inermis at Winnipeg, Man. (J.E. Machacek)

Scald (Rhynchosporium Secalis). A trace on Parkland brome grass at Lethbridge, Alta. (W.C. Broadfoot). Fround for the first time on this host in Man.; when infection was abundant in a few isolated patches on the banks of the Red River at Winnipeg; profuse conidial development. (J.E. Machacek)

Leaf Spot (Selenophoma bromigena). Infection was observed to be slight in 2 fields of B. inermis, moderate in 3 and severe in 4 in Man. (F.J. Greaney)

Smut (Ustilago bromivora). Severe infection on a few plants of B. ciliatus in Riding Mt. Park, Man. (T. Johnson)

CALAMAGROSTIS

Ergot (Claviceps purpurea). Slight infection on C. canadensis at South Alton, N.S. (R.M. Lewis)

Crown Rust (Puccinia coronata). Moderate to severe in the Laboratory plots, Winnipeg, Man., on C. inexpansa. (A.M. Brown)

DACTYLIS GLOMERATA - Orchard Grass

Purple Leaf Spot (Mastigosporium rubricosum). Infection general throughout the growing season on Vancouver Island and the lower mainland, B.C.; damage slight. (W. Jones)

Bacterial Leaf Spot (Pseudomonas syringae). Infection general but moderate in the Botanical Garden, Montreal, Que. (J.E. Jacques)

Stem Rust (Puccinia graminis). Infection slight but general in the plots at Morden, Man. (W.L. Gordon). Traces on wild plants in all counties of P.E.I. (R.R. Hurst)

ELYMUS - Rye Grass

Ergot (Claviceps purpurea). Infection a trace on E. canadensis in the plots at Morden, Man. (W.L. Gordon)

Leaf Spot (Phyllachora graminis). Infection severe on Elymus sp. at Edmonton, Alta. (A.W. Henry)

Crown Rust (Puccinia coronata). Moderately severe on E. canadensis, E. curvatus and E. dahuricus in the Laboratory plots, Winnipeg, Man. (A.M.Brown)

Leaf Rust (Puccinia montanensis). A slight infection in the telial stage of this rust occurred on the leaves of some plants of E. canadensis in the grass plots at Morden, Man.; the infection was severe on certain plants of E. dahurica, while adjacent plants were entirely free from rust. (W.L. Gordon)

Speckled Leaf Blotch (Septoria nodorum pro tem.). A trace was observed on some plants in the grass plots at Morden, Man. Spores measured 25-35 x 2.5-3.5 microns. For the time being the organism has been referred to S. nodorum because of its close morphological resemblance. A slight infection was also noted on E. giganteus in the same plots in a mixed infection with Scoletotrichum graminis. (W. L. Gordon)

Brown Stripe (Scoletotrichum graminis). A trace on some plants of E. giganteus in the plots at Morden, Man. (W. L. Gordon)

FESTUCA

Leaf Spot (Ascochyta graminicola). Slight infection on some plants of Festuca rubra in the grass plots at Morden, Man. The spores were 12.5-14 x 2.5-3 microns. A trace of Hendersonia crastophila Sacc., a new fungus for Man., was also found. The spores were 30-52.5 x 4-5 microns. (W. L. Gordon)

Ergot (Claviceps purpurea). A trace occurred on Creeping Red Fescue in the plots at Olds, Alta.

Stem Rust (Puccinia graminis). A trace of the uredinial stage present on F. rubra in the plots at Morden, Man. (W. L. Gordon)

HORDEUM - Barley

Stem Rust (Puccinia graminis). Slight uredinial infection present on Hordeum brevisubulatum in the plots at Morden, Man. (W. L. Gordon)

KOELERIA

Leaf Spot (Helminthosporium vagans) was abundant in a small planting of Koeleria cristata at Winnipeg, Man.; the leaves withered. (J.E. Machacek)

MUHLENBERGIA

Rust (Puccinia Schedonnardi Kell. & Swingle). A slight infection on a few leaves of Muhlenbergia cuspidata in the plots at Morden, Man. (W.L. Gordon). This is apparently the first Canadian record of this rust.

PHLEUM PRATENSE - Timothy

Leaf Spot (Heterosporium Phlei). Infection slight in the plots at Agassiz and at the University, Vancouver, B.C. (W. Jones); a trace to severe in clonal lines at Edmonton, Alta. (M.W. Cormack); general but not severe at the Botanical Garden, Montreal, Que. (J.E. Jacques); trace on the wild grass in P.E.I. (R. R. Hurst)

Stem Rust (Puccinia graminis var. Phlei-pratensis). Infection general and damage moderate on the lower mainland, B.C. (W. Jones). Infection moderate in a field near Edmonton, Alta. (M.W.C.). Rather heavy on some plants at the Botanical Garden, Montreal, Que. (J.E. Jacques). Infection a trace to heavy on timothy in all parts of P.E.I. (R. R. Hurst)

Crown and Root Rot (a low-temperature basidiomycete). Winter killing was slight in 2 fields and severe in a third, east of Edmonton. This fungus was isolated from the diseased material. (M.W. Cormack)

POA - Bluegrass

Ergot (Claviceps purpurea). A trace on P. Canbyi and P. glaucifolia in the plots at Morden, Man. (W. L. Gordon)

Powdery Mildew (Erysiphe graminis). Common on P. pratensis along the roadside at Langley, B.C. (W. Jones); moderate general infection on P. compressa and P. pratensis at Winnipeg, Man. (W. L. Gordon)

Stem Rust (Puccinia graminis). Uredinial infection was slight to moderate on P. Canbyi and slight on P. glaucifolia and P. nevadensis in the plots at Morden, Man. These are new host records for Man. (W.L. Gordon). In fact, this appears to be the first record of P. graminis var. Poae in Man. (I.L. Connors)

Brown Stripe (Scoletotrichum graminis). A trace of infection in the grass plots, Morden, Man., on P. compressa, a new host for Man. Spores were 35 x 8.5 microns. (W.L. Gordon)

TURF

Snow Mould (a low-temperature basidiomycete). Severe damage occurred in the early spring on many lawns and golf greens at Edmonton and other points in central and northern Alta. Although much of the killing was undoubtedly due to the weather, fungus mycelium was also commonly present. The low-temperature basidiomycete was the only pathogen isolated (M.W.C.). Snow mould caused severe damage to lawns at Saskatoon, Sask. The indications were that it was the major cause of "winter injury" in shaded and protected places. The "mould" was very conspicuous on April 4. Affected areas which were staked out the last week of March showed 50-100% injury 1½-2 months later. There was considerable variation in the amount of recovery, ranging from slight to virtually complete by fall. White clover and dandelions were completely killed out in the affected areas; only the grass showed recovery. The pathogen was isolated from lawn grasses at Saskatoon as early as 1932. (T.C. Vanterpool)

Snow Mould (Typhula sp.) caused a trace of damage in two small areas of a few square feet on the University campus, Saskatoon, Sask. The minute sclerotia, 0.5-1.0 mm. in diam., were common on decaying leaves and were readily cultured. Damage was slight, probably because the exposed nature of the diseased areas and the rapidity with which the snow receded. The affected areas have now fully recovered. A search has been made for this fungus at Saskatoon every spring since 1929, except in 1936, and this is the first time sclerotia have been observed. (T.C. Vanterpool)

Winter Injury appeared to be severe where the grass had become exposed during the winter at Saskatoon, Sask. It was especially severe on turf next to concrete walks across lawns. Here injury may have been, in part, due to packing of the snow rather than exposure. The grass made little or no recovery. (T. C. Vanterpool)

III. DISEASES OF VEGETABLE AND FIELD CROPS

ASPARAGUS

SOFT ROT (Erwinia carotovora). Several crowns were severely affected in one garden in Queens Co., P.E.I. (R.R. Hurst)

RUST (Puccinia Asparagi). Some plants in a small home garden were quite severely affected, others slightly so and still others showed no infection at Summerland, B.C. (G.E. Woolliams)

BEAN

GREY MOULD (Botrytis cinerea) caused moderate damage to the pods of Kentucky Wonder late in the season at the Station, Sidney, B.C. (W. Jones). Infection was slight in a plot of Pencil Pod Black Wax being grown for seed at Ste. Anne de la Pocatière, Que. It was also severe in a field of Michelite, and the crop was almost a complete loss due to rotting of the pods. Rain was continuous for a period (R.O. Lachance). Rot occurred on 1% of the pods of Pencil Pod Black Wax in a garden at Kentville, N.S. (R.M. Lewis)

ANTHRACNOSE (Colletotrichum Lindemuthianum). Infection was severe on Round Pod Kindney Wax in the University plots and a trace in several gardens at Edmonton, Alta. (M.W.C.). A moderate infection was observed on Round Pod Kidney Wax, Slender Green Pod and Golden Wax at Portage la Prairie, Man. A slight general infection occurred on most varieties, and a somewhat heavier one on Davis White Wax, at Brandon, Man., where the disease was severe last year (W.L.G.). Anthracnose was general on most varieties throughout the Niagara Peninsula, Ont. in 1943, but it was less prevalent on the later varieties (J.K. Richardson). Infection was moderate on field beans in the Guelph district, Ont. (J.D. MacLachlan). Anthracnose was severe on 30% of the plants and slight to moderate on the rest in a partially shaded plot on the Aylmer Road, Hull, Que., on June 24; the disease was so severe that the plot was a total loss. It was also apparently severe in a home garden at Ivry Nord (H.N. Racicot). Some 10% of the pods bore one or two lesions each in samples of canned beans of Yellow Wax and Refugee Green received from Ste. Angèle; spores and setae were seen (L.T. Richardson). Anthracnose caused severe damage on all 26 varieties in a test in York Co., N.B., except Hudson Lond Pod, Medal Refugee and Stringless Refugee Wax, which showed but slight infection and little damage (J.L. Howatt). Infection was very heavy in P.E.I. this year and damage was severe. (R.R. Hurst)

HALO BLIGHT (Pseudomonas medicaginis var. phaseolicola) affected the leaves of about 50% of the plants of Round Pod Kidney Wax, with little or no pod infection in a field at Grand Forks, B.C. No disease was found in one other field examined in the district (G.E. Woolliams). The disease was common and caused slight damage in 4 out of 15 plantings visited in Saskatoon, Sask. (R.J. Ledingham). Although halo blight was general in Lincoln Co., Ont., in no field was there any significant decrease in yield (J.K. Richardson). A trace of halo blight was seen in a field at Murray Harbour, P.E.I. (R.R. Hurst)

BACTERIAL BLIGHTS (Pseudomonas medicaginis var. phaseolicola and Xanthomonas phaseoli). Severe damage occurred in many gardens at Edmonton and Calgary, Alta. This situation is evidently due to seed commonly distributed in packets being diseased. Drought retarded blight development in most of the southern sections of the province, but a trace to a slight infection was present in the plots at Lethbridge. Beans grown from "Calapproved", reputedly disease-free seed imported from California, did not develop blight when the trial plantings were sufficiently isolated from diseased seed (M.W.C.). Infection by the bacterial blights was moderate to severe on the varieties at Morden, Man., general but slight in the plots at Brandon; it was also slight to severe in plantings elsewhere. (J.E. Machacek)

STEM ROT (Rhizoctonia Solani) caused slight damage in a garden at Edmonton, Alta. (L.E. Tyner). Damping off, due to the same organism, caused slight to severe damage in all 3 counties of P.E.I. (R.R. Hurst)

SCLEROTINIA ROT (S. sclerotiorum). Damage was slight in a garden at Edmonton, Alta. (L.E. Tyner)

RUST (Uromyces appendiculatus) was general and caused moderate damage in a field of Kentucky Wonder at Matsqui, B.C. (W. Jones)

BACTERIAL BLIGHT (Xanthomonas phaseoli) was observed in 6 out of 15 plantings examined in Sask.; in some plantings injury was severe. Reports and samples received indicate that the disease is widespread in the province (R.J. Ledingham). Brittle Wax and Pencil Pod were a complete loss due to bacterial blight in the plots at Ste. Anne de la Pocatière, Que.; other varieties were mildly infected. One field of Brittle Wax was badly affected in the Montreal district, a few showed a trace, but most were clean. Several fields were almost a failure due to excessive rain. Tender Green was generally clean (R.O. Lachance). Bacterial blight was present in varying amounts in P.E.I. (R.R. Hurst)

MOSAIC (virus) moderately affected a strain of field beans at Lethbridge, Alta., and a trace was present there also in Round Pod Kidney Wax and Blue Lake Pole Bean, and in Budsease Oregon at Olds (W.C. Broadfoot). A trace was present in one out of 15 plantings examined in Sask. (R.J. Ledingham). Mosaic infection was slight to severe in plantings near the Laboratory, St. Catharines, Ont.; it mostly affected the leaves and only the occasional pod (J.K. Richardson). Mosaic was general, but not severe, in many Victory gardens made at the Botanical Gardens, Montreal, Que. (J.E. Jacques). A trace of mosaic was present on several varieties in Queens Co., P.E.I. (R.R. Hurst)

CHLOROSIS (excess lime) was severe on Round Pod Kidney Wax at Fort Whyte, Man. (J.E. Machacek)

SCALD (magnesium deficiency) was quite severe in most local gardens at Charlottetown, P.E.I. It caused some loss due to premature defoliation and impaired pod development. (R.R. Hurst)

SUN SCALD (non-parasitic) was moderate in Kentucky Wonder being grown for seed at the Station, Sidney, B.C. It was worse in staked plants. (W. Jones)

BROAD BEANS

BLIGHT (Alternaria sp.) was severe on leaves, stems and pods of some plants at Morden, Man. (W.L. Gordon)

BASAL ROT. An occasional plant was affected at Morden, Man. Fusarium oxysporum was isolated. (W.L. Gordon)

MOSAIC (virus) affected about 10% of the plants in one out of 3 plantings examined in Sask.

BEET

SCAB (Actinomyces scabies). Nearly all the roots were moderately affected in 2 gardens at Edmonton, Alta. This is a new host record for Alta. (M.W.C.). Scab infection was a trace to severe in gardens in Queens Co., P.E.I. (R.R. Hurst)

LEAF SPOT (Cercospora beticola). Infection was general and caused slight damage to seed crops on the lower mainland and Vancouver Island, B.C. (W. Jones). Infection was moderate in two gardens at St. Adolphe and slight in another at Middlechurch, Man. (J.E. Machacek). Very few plantings were entirely free from infection, but no severe attacks were observed this year in Lincoln Co., Ont. (J.K. Richardson). Infection was a trace to heavy in Queens Co., P.E.I. (R.R. Hurst)

DOWNY MILDEW (Peronospora Schachtii). Several plants were infected on May 27, in a row of beets being grown for seed by a Chinese truck gardener at Keating, B.C. The disease has been found previously on 2 farms on the lower mainland (P.D.S. 21:30), but this was the first time it has been found on Vancouver Island. (W. Jones)

LEAF SPOT (Phoma Betae). A slight infection was recorded, mostly on the lower leaves, in 3 seed crops on the lower mainland, B.C. (W. Jones). A slight infection was general at Morden, Man.; it was severe on some leaves. A trace was also present at Middlechurch (W.L.G.). Over 10 bu. out of a total of 50 bu. of Early Flat Egyptian grown at Ste. Clothilde, Que., in 1943, from seed produced at Agassiz, B.C., were worthless on acount of rot due to Phoma Betae. Affected roots when planted in the greenhouse, Division of Horticulture, Central Exp. Farm, Ottawa, had failed to grow, when examined in Feb., 1944. Isolations yielded the organism. (L.T. Richardson)

BLACK ROOT (Rhizoctonia Solani). Over 50% of the roots were severely affected in a planting at Canaan, N.S.; the planting had to be resown. (G.W. Hope)

RUST (Uromyces Betae). A slight infection was present in one garden at North Saanich, B.C. (W. Jones)

CROWN ROT (boron deficiency) was present in Queens Co., P.E.I.; in one planting, 16% of the roots were affected. (R.R. Hurst)

ROOT ROT (cause undetermined). Stecklings planted for seed made poor growth early in the season on the lower mainland, B.C. The condition appears to have been brought about partly by the decay of the fibrous root system and partly by the cold weather at and following planting. Poor growth occurred in plants where the main root appeared sound. (W. Jones)

BROCCOLI

BLOSSOM BLIGHT (Botrytis cinerea, Alternaria, etc.) affected the inflorescence of 50% of the plants of Italian Broccoli being grown for seed at the Farm, Agassiz, B.C. Damage was severe in the affected plants. The exact cause was not determined. (W. Jones)

CABBAGE

BLACK LEAF SPOT (Alternaria circinans) was fairly general on the lower leaves in a few gardens on the lower mainland, B.C. It was not observed in July in 5 plantings being grown for seed, but the disease is frequently more prevalent later in the season. (W. Jones)

RING SPOT (Mycosphaerella brassicicola) was observed in one field at Metchosin, B.C., causing slight damage; it was not found in several other seed crops inspected in the coastal area. (W. Jones)

DOWNY MILDEW (Peronospora Brassicae) caused slight damage to the lower leaves in 4 seed crops in B.C. in June. Considerable damage was suffered by seedlings in cold frames at the Station, Sidney, B.C., in the fall months, and the disease persisted on the plants after they were transplanted to the field. (W. Jones)

BLACK LEG (Phoma lingam). Up to 8% of the plants were affected in plantings in Essex Co., Ont. There were indications that the plants were grown from infected seed. (L.W. Koch)

CLUB ROOT (Plasmodiophora Brassicae) continues to be spread to more victory gardens on Vancouver Island, B.C., mainly through the purchase of infected seedlings of cabbage and other crucifers (W.R. Foster). Club root was severe in one garden in Queens Co., P.E.I. and was reported from Prince and Kings Co. (R.R. Hurst)

BACTERIAL LEAF SPOT (Pseudomonas maculicola (McCull.) Stev. Fungi Pl. Disease 28. 1913; Bacterium maculicolum McCulloch, U.S.D.A., B.P.I. Bull. 225:14. 1911; Bacterium maculicola McCulloch, Phytopath. 18:460. 1928). About 75% of the heads were attacked in cold storage, Division of Horticulture, Central Exp. Farm, Ottawa, Ont., on October 15, with damage in decreasing severity on Golden Acre, Copenhagen Market and Glory of Ekhuizen. A trace was present on 3 other varieties. (H.N. Racicot)

SCLEROTINIA ROT (S. sclerotiorum). A few heads were severely diseased at Saskatoon, Sask. in August. (R.J. Ledingham)

BLACK ROT (Xanthomonas campestris). Cabbage plants growing in a field of rutabagas in Oxford Co., Ont., were slightly injured. The disease appeared on the margins of most of the outer leaves (J.K. Richardson). Black rot heavily infected a planting in a garden at Westboro, Ont., but only a few heads were seriously affected, with soft rot following. (D.B.O. Savile)

BROWN HEART (boron deficiency) caused slight damage to 1% of the plants in a planting in Queens Co., P.E.I. (R.R. Hurst)

HEAD CRACKING (cause unknown). Splitting open of the head was more common than usual in cabbage in city gardens, Saskatoon, Sask. (T.C. Vanterpool)

WINTER KILLING. Where stecklings were overwintered in situ in the field there was considerable winter killing on the lower mainland and Vancouver Island, B.C. Two plantings of Copenhagen Market were completely killed. (W. Jones)

CARROT

SCAB (Actinomyces scabies) was moderate to severe in a garden at Edmonton, Alta. This is a new host record for Alta.

BLACK ROT (Alternaria radicina). A few roots were found affected in carrots on the market in Vancouver, B.C. What was believed to be the same organism was isolated from a leaf spot and blight noted on the lower mainland (W. Jones). Black rot caused a loss of about 25% of the stecklings in storage last spring in the Grand Forks area, B.C. The disease caused most damage in storage cellars, but it was also present in pits. It was most severe on Chantenay, while Imperator appeared to be quite resistant. It also infected, in Oct., about 1% of the roots being grown at the Laboratory, Summerland, where the disease had not been observed previously. The land had not been planted to carrots before. These observations suggest that the pathogen is seed-borne. Affected roots were received from Vernon in Dec. 1943. (G.E. Woolliams)

A moderate infection of seedling blight was recorded at New Canaan, N.S. on July 29; the damage was placed at 20%. A very light infection of leaf spot was found at Kentville about the same time (G.W. Hope). A few affected roots were found at harvest in a small lot of carrots from untreated seed. Seed used in most commercial plantings was treated before sowing. (J.F. Hockey)

ROOT ROT (Botrytis cinerea) affected about 5% of the roots of Imperator and Chantenay stored in pits at the Station, Summerland, B.C. (G.E. Woolliams)

LEAF BLIGHT (Cercospora Carotae) was moderate in a victory garden in Lincoln Co., Ont., but damage was negligible (J.K. Richardson). Specimens of this leaf spot were collected by Frère M. Anselme at Mont Rolland, Que. (I.L. Conners)

SOFT ROT (Erwinia carotovora) destroyed about 10% of the stecklings in a few rows that had been set out for seed production at Agassiz, B.C. The loss was considerable in roots of seed plants in a field on Lulu Island; the crowns and leaf petioles were darkened (W. Jones). Roots affected by soft rot were received from Vernon. (G.E. Woolliams)

LEAF BLIGHT (Macrosporium Carotae) was found in a few gardens on the lower mainland, B.C., but the disease was not as general as usual. (W. Jones)

STEM ROT (Rhizoctonia Solani). A trace of infection was observed at Kentville, N.S. Affected plants showed dense mycelium girdling the petioles at the ground level. (J.F. Hockey)

SCLEROTINIA ROT (S. sclerotiorum) was present in a sample of roots received from Vernon, B.C. (G.E. Woolliams). Severe losses were reported in storage in Sask. during the winter of 1942-43 (T.C. Vanterpool). This rot caused 20% loss after two weeks in storage, in a crop of carrots that had followed beans; part of the crop that had followed potatoes was unaffected. (J.F. Hockey)

BACTERIAL BLIGHT (Xanthomonas Carotae) was present on June 29 on a trace to 5% of the plants in the Armstrong, Vernon, and Grand Forks districts, B.C. It was mostly on the seed crop, affecting not only the leaves but the developing umbels, which will result in reduced yields; it was also beginning to appear on the leaves of this year's seedlings. In July, Nantes was the most seriously affected variety in the Grand Forks district, while Imperator was the least injured. By Aug. 20, infection had become quite general on the seed crop; it appeared to be more prevalent than in 1942. Bacterial blight was found at Summerland for the first time, where it affected about 5% of the plants in the Laboratory plots. Carrots had not been grown previously on this land, but the seed used for this root crop was grown in 1941 and came from a field where bacterial blight was present. This seems to be direct evidence that the pathogen is seed-borne. (G.E. Woolliams)

Infection by bacterial blight was slight in the plots at Brandon and moderate to severe at Morden, Man. Slight to moderate infections were also recorded at Middlechurch and St. Vital (W.L.G.). A slight to moderate infection was present on July 20, on the leaves of a seed crop of the Division of Horticulture, Central Exp. Farm, Ottawa, Ont. On Aug. 13, 90% of the plants of Chantenay showed moderate to severe killing of the leaves with an occasional seed head killed (R.G. Atkinson). Bacterial blight was general, mostly on the leaf tips, of Imperator at the Botanical Garden, Montreal, Que., while other varieties were unaffected (J.E. Jacques). Diseased leaves collected by Father Léopold at La Trappe on Sept. 26, 1938 proved on examination to be affected by bacterial blight. (I.L. Conners)

YELLOWS (Callistephus virus 1) affected about 5% of the plants in a field in the Grand Forks area, B.C. (G.E. Woolliams). The disease was fairly widespread in Sask., but infection was usually a trace and was never over 5% of plants in the fields examined (R.J. Ledingham). Yellows was common in York, Sunbury, Queens, Kings, Westmorland and Albert Co., N.B. (D.J. MacLeod). The disease was less prevalent in N.S. in 1943 than in the previous year, but

fields were seen where 20% of the plants were affected. The average infection was about 5% (J.F. Hockey). Yellows was widely distributed in P.E.I.; a trace to 25% of the plants were affected in the individual plantings. (R.R. Hurst)

BORON DEFICIENCY (non-parasitic). Considerable difficulty was encountered with carrots being used for dehydration in the Vernon district, B.C. Samples showed symptoms of boron deficiency. These are a blackening of the central tissue which may be accompanied by one to several cavities. External symptoms are absent. Enquiry indicated that the trouble was fairly general in the Vernon area this season, but the percentage of roots affected was low. (H.R. McLarty and G.E. Woolliams)

CHLOROSIS (excess lime) slightly affected carrots in patches at Fort Whyte, Man. (J.E. Machacek)

CAULIFLOWER

BLACK LEAF SPOT (Alternaria circinans) was found in nearly all fields devoted to seed production in the coastal area of B.C., but losses were slight. The disease has been severe in some fields in other years (W.R. Foster). This spot was not general on the foliage of seed plants on the lower mainland and Vancouver Island, but an Alternaria was commonly associated with a curd rot. (W. Jones)

GREY MOULD (Botrytis cinerea). As a rot, this disease was observed in all fields in the coastal area of B.C., but the loss was slight (W.R. Foster). As a blight and wilt of the inflorescence it was fairly general in the coastal area and caused considerable damage to some seed crops. Affected branches of the inflorescence turn brown and woody. (W. Jones)

SOFT ROT (Erwinia carotovora) was observed in all fields devoted to seed production and caused slight to moderate damage in the coastal area, B.C. In one field 60% of the plants were affected, resulting in a loss of about 7%. To control the disease, once the curd is well formed, a grower must examine every head at intervals of one or two days, cut out the diseased portions found and apply copper lime dust. (W.R. Foster)

DOWNY MILDEW (Peronospora Brassicae) was general on the seed crop in the coastal area of B.C., but the losses were usually slight (W.R. Foster). Downy mildew was general on seedlings of 2 growers in North Saanich and at Duncan in April. Numerous plants were found systematically infected in 2 fields in North Saanich in September; affected plants suffered considerable damage. The mycelium was present in the main stems and the curd. The fungus also fruited on the bracts of the inflorescence. (W. Jones)

CLUB ROOT (Plasmodiophora Brassicae) affected a few plants in one seed crop in the coastal area, B.C. (W.R. Foster). A trace was present in several gardens and 15% of the plants were affected in one in Queens Co., P.E.I. (R.R. Hurst)

WIRE STEM (Rhizoctonia Solani) was observed in nearly all seed beds in the coastal area, B.C. (W.R. Foster). The disease caused moderate damage to seedlings in flats at Sidney and Elk Lake. The disease was completely controlled by treating the soil with formalin. (W. Newton)

WILT (Sclerotinia sclerotiorum) was found in 5 out of 10 fields examined in the coastal area, B.C. It appears to be increasing in importance and is compelling the growers to practise rotation (W.R. Foster). About 20% of the plants were affected in one seed crop on Vancouver Island. Affected plants may be killed (W. Jones)

BLINDNESS (cause undetermined). About 1-2% of the young plants were found to be blind in nearly all seed beds or in the field in coastal B.C. In one planting 40% of the plants were blind. Whiptail was suspected, but the hydrogen-iron concentration of the soil was pH 6.9, considerably higher than the average for the district, and the plants did not show other symptoms of whiptail. (W.R. Foster)

BOLTING occurred occasionally in the coastal area, B.C. One grower lost all his plants, which had suffered a severe check. Another grower whose plants started to bolt was successful in preventing virtually all the remaining plants from doing so by prompt application of fertilizer and water. (W.R. Foster

BROWN HEART (boron deficiency). Traces were present in several gardens in Queens Co., P.E.I., but it caused severe damage in one small garden due to discoloration of the curd and stunting of the leaves. (R.R. Hurst)

CURD ROT (complex cause) was fairly general and caused slight to severe damage in seed crops on Vancouver Island and the lower mainland, B.C., but it caused less damage than in 1942. (W. Jones)

DROUGHT resulted in an almost complete failure to produce seed in one planting in the coastal area, B.C. (W.R. Foster)

FROST caused considerable loss of seedlings or young plants in Jan., 1943, in the coastal area, B.C. The principal loss was in insufficiently heated greenhouses. Young plants in well built cold frames, covered to protect the plants from sunlight, survived -6°F. in one case and 7°F. on several occasions. About 40% of plants out of doors survived the 25° of frost. (W.R. Foster)

CELERY

CROWN ROT (Ansatospora macrospora (Osterw.) Newh.), a serious cold storage disease of celery, is stated by A.G. Newhall (Phytopath. 34:92-105. 1944) to occur not only in New York State, but also in Ont. Although the disease is fairly widespread, losses tend to be confined to the late-grown celery from particular farms or fields. According to J.H.L. Truscott (in litt.), a culture of the organism from celery grown at Thedford, Ont. was sent to Newhall in 1935-36 and has proved to be this organism. (I.L. Conners)

LATE BLIGHT (Septoria Apii-graveolentis) was of fairly general occurrence on Vancouver Island and the lower mainland, B.C.; it caused less damage than usual due to dry weather in the fall (W. Jones). Commercial plantings were only mildly affected in the Armstrong district, B.C. About 25% of the plants showed slight leaf infection (G.E. Woolliams). Blight infection was moderate in one commercial planting and slight in a few gardens at Edmonton, Alta. (H.W.C.). Infection was moderate to severe south of Winnipeg, Man. (J.E. Machacek)

BLACK HEART (non-parasitic). Celery growing in a cold frame at the Station, Beaverlodge, Alta., was severely affected in August. Specimens from Mr. Albright, Superintendent, were sent to J.K. Richardson of the St. Catharines Laboratory, who diagnosed the trouble as physiological black heart. Similar symptoms were observed at Edmonton and Lethbridge. This is the first report for Alta. (G.B. Sanford). Losses from black heart are decreasing each year in the Niagara Peninsula, Ont., since growers are planting more resistant varieties and are reducing their plantings of the early crop (J.K. Richardson). Black heart affected 75% of the plants of Salt Lake and Golden Self Blanching at the Station, Ste. Anne de la Pocatière, Que. The affected plants were almost a total loss. (R.O. Lachance)

CHIVES

DOWNY MILDEW (Peronospora Schleideniana). Affected specimens were collected at Mount Rolland, Que., on Aug. 20 by Frère M. Anselme (DAOM 13235). This is a new host record for the Survey. (I.L. Conners)

RUST (Puccinia Porri (Sow.) Wint.) affected a few plants at Vancouver, B.C. on May 27 (DAOM 14082) (J.W. Eastham). A specimen on onion collected by W.R. Foster at Victoria, B.C. in 1939 (DAOM 6858) has been referred to this species. Only uredinia are present in both collections. (I.L. Conners)

CUCUMBER

LEAF SPOT (Alternaria cucumerina) caused moderate damage in plants grown for seed at Duncan, B.C. (W. Jones)

SCAB (Cladosporium cucumerinum) affected all the fruits in a garden at Almonte, Ont., and a diseased specimen was received from Islington (H.N. Racicot and L.T. Richardson). Scab caused serious damage to cucumber plantings in the Maugerville-Jemseg district, N.B. (J.L. Howatt). Traces occurred in many plantings in Queens Co., P.E.I., but no serious outbreaks were seen. (R.R. Hurst)

ANTHRACNOSE (Colletotrichum lagenarium) affected up to 80% of the plants in a field of cucumbers in Essex Co., Ont., and caused moderate damage.

WILT (Fusarium sp.) was found on several varieties being grown in the merit trial plots at the Station, Summerland, B.C. (G.E. Woolliams). A severe infection was found at Lac du Bonnet, Man. The diagnosis was not checked by isolations (J.E. Machacek)

ANGULAR LEAF SPOT (Pseudomonas lachrymans (Sm. & Bryan) Carsner, Jour. Agr. Research 15:201. 1918; Bacterium lachrymans Sm. & Bryan, Jour. Agr. Research 5:466. 1915). Infection was moderate on President and Vaughan in the plots at Lacombe, Alta. (W.C. Broadfoot)

FRUIT ROT (Pythium sp.) was severe on fruits in storage at Winnipeg, Man. (J.E. Machacek)

STEM and FRUIT ROT (Sclerotinia sclerotiorum) affected up to 5% of the plants of Perry's Special in a greenhouse in Essex Co., Ont., causing moderate damage. (L.W. Koch)

MOSAIC (virus) was found affecting some plants at the Station, Summerland, B.C. (G.E. Woolliams). Mosaic affected all the plants in an eighth of an acre being grown for seed in Wentworth Co., Ont.; consequently the crop was a total loss. The planting was heavily infested by aphids (J.K. Richardson). Some 2% of the plants were affected by mosaic in a field in Essex Co., Ont. (L.W. Koch). Mosaic (Cucumis virus 1) caused severe damage on two farms in Sunbury Co., N.B. (D.J. MacLeod). Mosaic was present in virtually all of the 21 plantings examined in P.E.I. (R.R. Hurst)

DILL

BLIGHT (Phoma Anethi (Pers.) Sacc.) was so severe in a planting of dill examined on Oct. 10, at Streetsville, Ont., that hardly any seed was formed (J.K. Richardson). Excellent material was received from Mr. Richardson for identification (DAOM 14065). The pycnidial stage present agreed with Phoma Anethi as represented in Fl. Hung. Exs. 105. A hyphomycetous stage was also present; this agrees with the description given for Cercosporina Anethi Sacc. (cfr. Sacc. Syll. Fung. 25:916. 1931), which is based on specimens collected at Kulm, N.D. and distributed in Brenkle, Fungi Dakotenses 253, Oct. 1914, as Cercosporella Anethi Sacc. (Mycologia 10:216. 1918). This disease is known from Germany, France, Sweden, Portugal and Belgium (Saccardo, Syll. Fung. 3:125), Denmark (J. Lind, Danish Fungi 1913), the Ukraine (R.A.M. 17:771) and the United States (Pl. Dis. Reporter 11(10): 126. 1927). (I.L. Conners)

EGG PLANT

WILT (Verticillium Dahliae) was present in all plantings observed in Lincoln Co., Ont.; infection ranged from a trace to 50%. (J.K. Richardson)

MOSAIC (virus). A single plant was found infected at Winnipeg, Man. (J.E. Machacek)

ENDIVE

LEAF DROP (Sclerotinia sclerotiorum). The disease caused dropping of the lower leaves of plants growing in a greenhouse bed at Winnipeg, Man. A soft decay with sclerotia was present. (J.E. Machacek)

HOP

DOWNY MILDEW (Pseudoperonospora Humuli) was general early in the season on Clusters and Golding in the Fraser Valley, B.C. The disease was later checked by dry weather and the crop was harvested during ideal weather (W. Jones). Almost all the leaves were spotted by downy mildew in the Arboretum, Ottawa, Ont., but it caused little damage. A moderate infection occurred on hops being used as an ornamental vine at Abbotsford, Que. The damage was slight, but sufficient to check the development of the inflorescence. A specimen was collected at Mt. Rolland by Frère M. Anselme. (D.B.O. Savile)

HORSE RADISH

WHITE RUST (Cystopus candidus) heavily infected a single patch at the edge of a garden at Abbotsford, Que.; the damage was severe. Although this disease is reported by K.J. Kadow and H.W. Anderson (Ill. Agr. Exp. Sta. Bull. 469. 1940) to be widespread in all countries where horse radish is grown, this is the first record in the Survey and no other specimens are in the Herbarium. Kadow and Anderson state that the form of C. candidus on horse radish is distinct from the forms common on cruciferous weeds; this may account for its scarcity in Canada, where horse radish is grown widely but not intensively. (D.B.O. Savile)

LEAF SPOT (Ramularia Armoraciae). A moderate infection was found in several plantings at Edmonton, Alta.

LEEK

GREY MOULD (Botrytis cinerea) caused moderate losses as a rot in one large field in the coastal area, B.C. (W.R. Foster)

BLIGHT (Heterosporium Allii Ell. & Martin) was general on the lower leaves of 2 seed crops in the Victoria district, B.C.; the damage was slight (W. Jones). The fungus was identified by J.E. Jacques. This is the first report of the fungus to the Survey. (I.L. Conners)

LETTUCE

GREY MOULD (Botrytis cinerea). A few flowers and branches of the inflorescence were killed in a plot at the Station, Sidney, B.C. (W. Jones)

DOWNY MILDEW (Bremia Lactucae) was general on 3 seed crops in the Sidney and Victoria districts, B.C. and caused considerable damage (W. Jones). The disease affected about 30% of the seedlings, after pricking off, in a greenhouse in Lincoln Co., Ont.; many were stunted and killed. (J.K. Richardson)

ANTHRACNOSE (Marssonina Panattoniana) was general in a 2-acre field at Keating, B.C., and caused considerable damage to the foliage. (W. Jones)

ROOT ROT (Rhizoctonia Solani) caused moderate damage to several crops of early lettuce in Essex Co., Ont. (L.W. Koch)

DROP (Sclerotinia sclerotiorum). Damage was severe in several gardens at Edmonton, Alta., and was moderate to severe in the variety plots at Lacombe.

TIP BURN (non-parasitic) was present in the variety plots, Summerland, B.C. Infection varied from 29.5% in Sweetheart to 67.6% in New York No. 12. Some plants were so severely injured that their marketability was lowered, but the majority suffered only slightly, especially the tip-burn resistant Sweetheart. (G.E. Woolliams)

MELON

BACTERIAL WILT (Erwinia tracheiphila) affected up to 4% of the melon plants in plantings examined in Essex Co., Ont.; the damage was moderate (L.W. Koch). Wilt infection was general in Lincoln Co., but was never severe, the highest being 5%. (J.K. Richardson)

MOSAIC (virus) affected a few plants in the cantaloupe merit trials at Summerland, B.C. (G.E. Woolliams)

OKRA

WILT (Verticillium Dahliae) affected 50% of the plants in the single planting examined in Lincoln Co., Ont.; some plants were killed while others were only slightly affected with the result that the yield was reduced about 25%. (J.K. Richardson)

ONION

BLACK MOULD (Aspergillus niger). A slight infection was observed on Australian Brown at Victoria, B.C. (W. Jones)

NECK ROT (Botrytis Allii) was reported causing moderate rotting at Vernon, B.C., in stored bulbs, to be used for seed production in 1944, accompanied by an affected sample. It was also observed in the field at Grand Forks, Vernon and Oliver; a cool, backward spring apparently favoured its development (G.E. Woolliams). The disease caused severe rotting of onions in storage from a garden at Edmonton, Alta. (M.W.C.). Severe in onions stored in a basement, Saskatoon, Sask. in January (T.C. Vanterpool). Neck rot seemed less prevalent in 1943 than for the past several years in Lincoln Co., Ont., although most of the observations were made prior to the storage period (J.K. Richardson) A few onions were affected at Kentville, N.S. (J.F. Hockey)

SOFT ROT (Erwinia carotovora) was reported in August to be very prevalent at London, Ont.; affected specimens were received. (L.T. Richardson)

BULB ROT (Fusarium oxysporum f. Cepae) affected about 2% of the bulbs of the affected strains or varieties in the merit trials at the Station, Summerland, B.C. This is the first time the disease has been found at the Station, although it is a destructive disease in B.C. (cf. P.D.S. 19:43) (G.E. Woolliams). Multiplier onions and shallots grown in wet land in Kings Co., N.S. were affected by dry rot after a short period in storage; the loss was 10%. (J.F. Hockey)

DAMPING-OFF. About 5% of the seedlings grown in sterilized soil in flats in the greenhouse, at Sidney, B.C. were affected. A Fusarium isolated from the affected seedlings was identified by W.L. Gordon as F. Scirpi. (I. Mounce)

PURPLE BLOTCH (Macrosporium Porri) infection was a trace at Middlechurch and slight at Charleswood, Man., on Yellow Globe Danvers; a slight infection also occurred at Morden, Man. (J.E. Machacek)

DOWNY MILDEW (Peronospora Schleideniana) caused severe damage to 2 seed crops on Vancouver Island, B.C.; the loss was 50% of the crop. The disease was first noticed at Keating on a row of seed plants in mid-May. Later in the season it was present in all gardens inspected including young plants intended for seed production next year. Downy mildew was also widespread on the lower mainland (W. Jones). Downy mildew was found in July in the Grand Forks district on the seed crop grown close to the Kettle River, where the humidity was probably more favourable for the spread of the disease. The spring was cool and backward with periods when heavy rain showers occurred on consecutive days. Up to 80 to 90% of the plants were affected in some fields with lesions on both the leaves and flower stalks. By August the disease had become quite general in the bulb crop. This was the first time downy mildew had been observed in the Grand Forks district. It was again present in the Armstrong district; observations indicated that the disease was carried over in affected bulbs. (G.E. Woolliams)

Downy mildew affected 60% of the plants and caused moderate damage in a planting in Essex Co., Ont.; a system of overhead watering was used (L.W. Koch). A moderate infection of the seed stalks was observed at Streetsville, Ont. (J.K. Richardson). A severe infection of downy mildew, which reduced the stand 50%, was observed at St. Damase, Que. Traces were also observed in the plots at Ste. Anne de la Pocatière (A. Payette and R.O. Lachance). The disease was collected at Mont Rolland. (I.L. Conners)

LEAF SPOT (Stemphylium botryosum) was general on 2 seed crops on Vancouver Island, B.C., following attack by downy mildew. (W. Jones)

SMUT (Urocystis Cepulae). Infection was slight in one field and severe in another at St. Vital, Man. (J.E. Machacek)

BACTERIAL BLISTER. Leaves of Yellow Globe Danvers bore abundant whitish raised blisters in a planting at Lakeland, Man. Microscopic examination revealed plentiful bacterial ooze escaping from the blisters, and the blistered tissue filled with gas. (J.E. Machacek)

PARSLEY

LEAF BLIGHT (Septoria Petroseleni) was general on one seed crop at Duncan, B.C., and caused slight damage to the foliage. (W. Jones)

PARSNIP

SCAB (Actinomyces scabies). A severe infection occurred in a garden at Edmonton, Alta. This is a new record for Alta. (M.W. Cormack)

LEAF SPOT (Cylindrosporium crescentum). Infection was general and slight at St. Norbert and severe in patches on Hollow Crown Guernsey at St. Vital, Man. (J.E. Machacek)

SOFT ROT (Erwinia carotovora). A severe infection occurred in a planting at Vernon, B.C., where at least 50% of the roots were affected, according to H.H. Evans, District Field Inspector, who submitted the specimens. (G.E. Woolliams)

LEAF SPOT (Ramularia Pastinacae). Infection was fairly general in 3 seed crops located at Cadboro Bay, Milner and Ryder's Lake, B.C.; it caused slight damage to the foliage (W. Jones). Infection was moderate to severe in a planting at Edmonton, Alta. (DAOM 14037, 14038, 14070) and a trace on Hollow Crown at Lacombe (W.C. Broadfoot). A moderate infection occurred on the foliage in an early planting at Upper Canard, N.S. (14086) (J.F. Hockey). This disease has also been reported as due to Cercosporella Pastinaceae. Besides the specimens recorded above, the fungus is represented in the Herbarium from Keating, B.C., July 10, 1940 (6485); Milner, B.C., July, 1942 (14085) and Big Tancook Island, N.S., Aug. 5, 1942 (12312). Critical study revealed that the Ramularia predominated in the specimens; but careful search usually yields some Cercosporella, and even immature Cercosporella and Ramularia spores attached to conidiophores in the same tuft. A full range of conidiophore differences may be seen associated with each spore type. A.D. Cotton (Kew Bull. Misc. Inf. 1:18-20, 1918) considered the two fungi, under the names Cercosporella Pastinacae Karst. and Ramularia Pastinacae Bubak, as distinct, but found them almost always associated with Ramularia predominant. J.I. Lindroth (Acta Soc. Faun. Flor. Fenn. 22(2):8. 1902) considered the fungus described by Karsten (Hedwigia 23:63. 1884) as Cercosporella Pastinacae to be a Ramularia and proposed the new combination, Ramularia Pastinacae (Karst.) Lindr. & Vestergr. P.H. Gregory (Trans. Brit. Myc. Soc. 23:24-59. 1939) has shown beyond all reasonable doubt, in his study of Ramularia Vallisumbrosae Cav. on Narcissus, that R. Vallisumbrosae and Cercosporella Narcissi Boud. (R. Narcissi Chit.) are identical. Monospore cultures of amerospores (one-celled), phragmospores (Ramularia) and scolecospores (Cercosporella) yielded the same fungus and upon inoculation of the host yielded typical Ramularia spots. W.C. Moore (Trans. Brit. Myc. Soc. 25: 208. 1941) gives evidence that Ramularia Primulae Thüm. and Cercosporella Primulae Allesch. are genetically identical. R. Virgaureae on Solidago appears to be similarly pleomorphic. Other cases may exist, for many genera are reported with both Ramularia and Cercosporella as parasites. Single spore isolations are required to clear up the identity of the two forms on parsnip. It may be noted that if the two forms prove to be distinct species, the

Ramularia is without a name, as Ramularia Pastinacae Bubak (1903) is a later homonym. This fungus is not to be confused with Cercospora Pastinacae (C. Apii var. Pastinacae) as present in Seym. & Earle, Ec. Fungi 443, on Pastinaca sativa, New Brunswick, N.J. 1892, Halsted; spots not clearly delimited; conidiophores pale brown, short; conidia 56-84 x 4-5.5 microns, 3-septate. The Cercospora is reported in P.D.S. from Ont., Que., and P.E.I.; but Canadian specimens seen, including that for the P.D.S. record for Ont., have proved to be the Ramularia. (D.B.O. Savile and I.L. Conners)

SCLEROTINIA ROT (S. sclerotiorum). Severe rotting occurred in one garden at Edmonton, Alta. (L.E. Tyner). This rot was found affecting 28% of the roots of Hollow Crown in a garden in Queens Co., P.E.I., on Aug. 3; the damage was severe. (R.R. Hurst)

YELLOWS (Callistephus virus 1) affected 5% of the plants in a crop of Hollow Crown being grown for seed at Grand Forks, B.C. (G.E. Woolliams)

PEAS

LEAF and POD SPOT (Ascochyta Pisi). Infection occurred early in the season and the disease was severe in many gardens at Edmonton, Alta. Infection was slight to moderate in the variety plantings at Olds and Lethbridge, a trace to severe in garden peas and a trace to slight in field peas at Lacombe (M.W.C.). A slight infection was present at the Station, Ste. Anne de la Pocatière, Que. (R.O. Lachance). Leaf and pod spot was quite general in the Middleton district, N.S., on canning peas (J.F. Hockey). It affected about 2% of the pods and was quite heavy on the foliage in Queens Co., P.E.I. (R.R. Hurst)

LEAF SPOT (Cladosporium pisicola). A trace was noted in a planting in Queens Co., P.E.I. (R.R. Hurst)

POWDERY MILDEW (Erysiphe Polygoni). Infection was severe in many gardens at Edmonton, Alta., and varied from slight to severe in the variety plots at Lethbridge (M.W.C.). Powdery mildew was widespread, but did not appear until late in the season in Sask.; it was severe in gardens that were frequently watered (H.W.M.). A moderate infection was observed at Morden, Man., with leaves and pods severely affected on some plants (W.L. Gordon). Although powdery mildew may have been more severe in P.E.I., only a scattered infection was observed in one garden in Queens Co. (R.R. Hurst)

ROOT ROT (Fusarium Solani) was recorded in 6 plantings out of 12 examined in Sask. and caused 2 to 5% damage. Affected plants were wilting and dying and a reddish-brown cortical decay of the stem base was a common feature (R.J. Ledingham). A wilt caused considerable loss of plants in one garden at Wolfville, N.S. (J.F. Hockey)

MYCOSPHAERELLA BLIGHT (M. pinodes (Ascochyta pinodes) was general in variety plantings at the Farm, Agassiz, B.C.; and caused considerable damage (W. Jones). This blight was observed in several localities in Man.; infection moderate in a 2-acre field at Gonor, trace on leaves and pods of Little Marvel at Middlechurch, slight on Harrison's Glory and B.C. Blue, none on Alaska at

Portage la Prairie (J.E. Machacek); trace, but general at Morden. Spores 12.5-17.5 x 3.5-6 microns (W.L. Gordon). Considerable infection was observed in several plantings in Lincoln Co., Ont., but the pods were already well formed; accordingly, loss of yield was probably slight. (J.K. Richardson)

DOWNY MILDEW (Peronospora Pisi) was widely distributed on peas on Vancouver Island and the lower mainland, B.C., but the damage was very slight. (W. Jones)

BACTERIAL BLIGHT (Pseudomonas Pisi). Infection was severe on Meteor but only a trace or slight on other varieties at Lacombe, Alta. (W.C. Broadfoot). Infection was recorded in Man, as severe in a 12-acre field at Middlechurch (most pods unsaleable), moderate in a 2-acre field at Gonor, slight at St. Norbert, trace at Parkdale and on Alaska at Portage la Prairie (J.E. Machacek), slight to severe on leaves and pods in plantings at Morden (W.L. Gordon). A slight scattered infection was found on Thomas Laxton and Laxton Progress out of the 5 varieties inspected in the plots, Division of Horticulture, Central Experimental Farm, Ottawa, Ont.; the damage was negligible. (R.G. Atkinson)

LEAF SPOT (Septoria flagellifera). A few spots were found on the leaves at Brandon and Winnipeg, Man. Spores 75-165 x 2.5-3.0 microns. S. flagellifera is much less common than S. Pisi. (W.L. Gordon)

LEAF BLOTCH (Septoria Pisi). Infection was moderate at St. Norbert, Man. and on a canning variety, #103, at Portage la Prairie, slight on Little Marvel at Middlechurch (J.E. Machacek), usually slight at Brandon, rather heavy on lower leaves of Onward at Morden. Spores 27.5-47 x 2.5 microns. (W.L. Gordon)

RUST (Uromyces Fabae). A slight infection was observed in a field of Stratagem, grown for seed at North Saanich, B.C. (W. Jones). Rust was quite common on garden peas at the Station, Vineland, Ont. (D.L. Bailey). Rust was present on all varieties at Ste. Anne de la Pocatière, Que., with infection trace to slight (R.O. Lachance). A trace of rust was recorded at Middleton, N.S. (D.M. MacLeod). Infection was generally quite heavy on peas in Queens Co., P.E.I., and caused moderate to severe damage. (R.R. Hurst)

MOSAIC (virus) was recorded in one planting out of 12 examined in Sask.

DIE BACK (?boron deficiency). A new disorder developed on peas growing in the reclaimed area at Creston, B.C. It is characterized by a die back of the growing tips soon after seed germination, which results in a proliferation of growth. From one to three shoots, which have died back, may be found and the first shoot, if it continues to grow, reaches an ultimate length of about 6 inches. Alfalfa on the area sometimes shows signs of boron deficiency, and this "die back" is thought to be due to the same cause. Percentage of plants affected varied from a trace to 50% depending on the variety; Alaska and Surprise were most affected, while Thomas Laxton was only slightly in ured. (G.E. Woolliams)

PEPPER

WILT. Botrytis sp. was isolated from one plant showing definite symptoms of wilt at the Station, Sidney, B.C. W. Jones)

FRUIT ROT. Some 75% of the fruit in a retail store in Winnipeg, Man., was damaged by a rot with which Penicillium and Botrytis were associated. (J.E. Machacek)

ROOT ROT. An unidentified fungus was isolated from pepper plants affected by a root rot in a greenhouse at Medicine Hat, Alta. (G.B. Sanford)

INFECTIOUS CHLOROSIS (virus) affected a few plants at the Station, Summerland, B.C. (G.E. Woolliams)

Pepper plants were found affected by an unusual chlorotic symptom in the Brantford district and in Lincoln Co., Ont.; they were found to be affected by a strain of Medicago virus 1. (G.H. Berkeley and G.C. Chamberlain)

MOSAIC (Solanum virus 2). Two out of 16 plants of Banana were infected at the Station, Morden, Man. Other varieties and hybrids were free from disease (J.E. Machacek). Although no planting was seen in Lincoln Co., Ont., with more than 5% of the plants affected by mosaic, few were observed where the disease was absent. (J.K. Richardson)

POTATO

The Plant Protection Division, Science Service, had supplied the compilations on the extent of the seed potato industry, the acreages of the leading varieties passing inspection, the number of fields which failed to pass inspection, and the average percentages of the diseases - black leg, leaf roll, and mosaic - found in the fields. All fields entered for certification are planted with certified seed.

The acreage of potatoes grown for certification was increased in 1943 by 4,966 acres or 16.6% over that of 1942, but the acreage passing inspection was very little higher than the previous year for the percentage that passed fell from 62.9% to 54.8%. This further deterioration was largely due to the alarming increase of leaf roll. About 25% of the fields entered for certification were rejected for leaf roll in P.E.I. and N.B., the two leading seed potato producing provinces. Mosaic, however, is also an important cause of rejection, although it has yielded first place to leaf roll. The amount of bacterial ring rot has decreased somewhat and already the policy of refusing registration to seed stocks growing on farms where bacterial ring rot was present in other plantings seems to be having a beneficial effect. The elimination of seed stocks from farms where bacterial ring rot was found in other fields in the current season, should reduce the chances of healthy seed stocks becoming contaminated. A similar policy to assist the larger table stock growers to get rid of any diseased stock they may have, should reduce serious economic losses from the disease to a minimum. The disease is still firmly established in Que. and there were more rejections than usual in Man. and Alta.

Table 4: Seed Potato Certification: Number of Fields and Acres Inspected, 1943.

Province	Number of Fields		Fields Passed %	Number of Acres		Acres Passed %
	Entered	Passed		Entered	Passed	
P.E.I.	4,260	2,362	55.4	16,481	8,555	51.9
N.S.	346	214	61.8	780	546	70.0
N.B.	1,955	1,168	59.7	11,459	6,725	58.6
Que.	1,302	512	39.3	2,511	810	32.3
Ont.	773	582	76.0	1,879	1,314	69.9
Man.	105	80	76.2	172	121	70.3
Sask.	89	76	85.4	88	72	81.8
Alta.	166	128	77.1	428	245	57.2
B.C.	566	398	70.3	1,149	760	66.1
TOTAL	9,562	5,520	57.7	34,947	19,148	54.8
Previous Yearly Totals						
1942	7,947	5,023	62.2	29,981	18,875	62.9
1941	9,813	6,404	65.3	37,668	24,405	64.8
1940	12,388	8,676	70.0	48,111	34,094	70.1
1939	10,805	8,201	75.9	40,286	31,545	78.3

Acres Entered		Acres Passed	
1942	29,981	1942	18,875
1943	34,947	1943	19,148
Increase of 4,966 or 16.6%		Increase of 273 or 1.4%	

Table 5. Seed Potato Certification: Acreages Passed by Varieties, 1943

Variety	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.-Alta.	B.C.	Total
Green Mountain	2,512	45	2,035	697	65	22	52	5,428
Katahdin	852	230	3,240	16	823	26	13	5,200
Irish Cobbler	4,332	142	238	45	138	55	7	4,957
Bliss Triumph		32	1,153			4	2	1,191
Sebago	814	45	45		23			927
Netted Gem	3				5	253	501	762
Chippewa	5	6	6	14	213		24	268
Warba		10	2		22	25	27	86
Houma	33		2	35		1		71
White Rose							52	52
Early Epicure							36	36
Sequoia	1	25			2	1		29
Other Varieties	2	11	4	3	23	51	46	141
TOTAL	8,555	546	6,725	810	1,314	438	760	19,148

COMMON SCAB (Actinomyces scabies) was severe in Man. in one lot of tubers; the lot could not be certified. Slight amounts of scab were prevalent throughout the province (W.A. Cumming). Common scab was quite severe in Ont., notably in Wellington Co. and parts of York Co. A skin scurf, somewhat resembling scab, was noted in Norfolk Co., where the iron content of the soil is high (J.W. Scannell). Affected specimens were received from Aylmer and Beaverton (L.T. Richardson, H.N. Racicot). Scab was of minor importance in Que. in fields entered for certification, except in 3 fields, where lime had been applied in past years. Reports indicate that in some parts of the Montreal district, fields of table stock were seriously affected (B. Baribeau). A slight infection was noted in a few lots of tubers on bin inspection in N.B. (C.H. Godwin). Common scab was found in over a third of the lots inspected, and the average tuber infection was about 2%, or double that of 1942, although this season was unusually wet (W.K. McCulloch). Traces of scab were present in table stock throughout P.E.I. (R.R. Hurst)

Table 6. Seed Potato Certification: Fields Rejected on Field Inspection, 1943.

Province	Leaf Roll	Mosaic	Ring Rot in field	Ring Rot on farm	Adjacent Diseased Fields	Black Leg	Foreign Varieties	Misc.	Total
P.E.I.	1,174	378			139	43	52	112	1,898
N.S.	44	33			25	2	10	18	132
N.B.	485	110	39	23	76	3	33	18	787
Que.	210	182	155	15	92	28	18	90	790
Ont.	5	39	8	9	24	15	31	60	191
Man.	5		8	4		2		6	25
Sask.	1	3			3	3		3	13
Alta.	11	3	4	4	10	3		3	38
B.C.	54	40			46	6		22	168
TOTAL	1,989	788	214	55	415	105	144	332	4,042
Rejections as a percentage of fields:									
Entered	20.8	8.2	2.2	0.6	4.4	1.1	1.5	3.5	42.3%
Rejected	49.2	19.5	5.3	1.4	10.3	2.5	3.6	8.2	100.0%

Table 7. Seed Potato Certification: Average Percentage of Disease found in Fields, 1943.

Average percentage of disease found in	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
	%	%	%	%	%	%	%	%	%
Fields entered: (first inspection)									
Black Leg	.18	.08	.04	.08	.09	.14	.13	.13	.05
Leaf Roll	2.21	1.16	1.97	.95	.32	.54	.09	.99	.94
Mosaic	.90	.85	.48	.86	.08	.05	.28	.18	.70
Fields passed: (final inspection)									
Black Leg	.05	.04	.02	.01	.02	.07	.01	.02	.03
Leaf Roll	.29	.24	.32	.15	.12	.10	.01	.02	.09
Mosaic	.09	.04	.14	.09	.04	.01	.05	.01	.07

EARLY BLIGHT (Alternaria Solani) was unusually severe in central Alta., and caused the premature death of the vines in many plantings of early varieties at Edmonton. The later planted varieties were not so severely affected (M.W.C.). Diseased specimens were received from Lanigan and Speers, Sask., following a newspaper warning to be on the look-out for late blight; it probably was not serious (T.C. Vanterpool). Early blight was prevalent throughout Man., but no severe damage was seen (W.A. Cumming). Infection was recorded as a trace in one field, slight in 2, moderate in 2, and severe in one in Man. (J.E. Machacek). Early blight caused very slight damage in Que., except in a few fields in the Lake St. John district, where a heavy infection was present as early as July 5 (B. Baribeau). Early blight was more prevalent than usual in N.B., owing to the favourable season (C.H. Godwin). Early blight was reported in Kings Co., N.S., on Aug. 12 and in Colchester Co. on Aug. 19. It was much less noticeable than usual, probably because of the greater prevalence of late blight. Sometimes the two diseases were seen on the same leaflet. Most of the infection was on Irish Cobbler. No Alternaria rot was seen (W.K. McCulloch). Traces were present in most fields of Irish Cobbler in P.E.I., but there was little development of the disease. Alternaria rot was seen occasionally on tubers of the 1942 Irish Cobbler crop in May, 1943. (R.R. Hurst)

GREY MOULD (Botrytis cinerea) caused a rot in 28 tubers (8%) out of 360 of Sequoia, from which an eye had been removed for tuber indexing and which had been kept in cold storage over the winter at Saanichton, B.C. Tubers of White Rose, Early Rose, Burbank, Early St. George, and Warba, from which eyes had been similarly removed, were not affected (W. Jones and E.R. Bewell). Sclerotia of Botrytis are found abundantly each year on dead potato tops in P.E.I. (R.R. Hurst)

BACTERIAL RING ROT (Corynebacterium sepedonicum). A shipment of potatoes from Man. was sold to the Army, because a few infected tubers were found upon inspection. Instead of using all the shipment for food as advised, some of them were used for seed at Esquimalt, B.C., because other potatoes were not available. This disease was recognized by army personnel and brought to my attention. Efforts to eradicate it were made. This is the first case observed on Vancouver Island (W.R. Foster). The disease was also found at Vancouver, on Dec. 2, in a shipment of table stock White Rose potatoes from Ladner, B.C., by Mr. Robinson, Fruit and Vegetable Inspector. A few tubers were found in the bin, when it was visited later. This is the first case in locally grown potatoes on the lower mainland. Steps have been taken to eradicate the disease. (H.S. MacLeod, W. Jones)

A considerable enlarged survey for bacterial ring rot was conducted in southern Alta. in 1943. About 1,000 farms were visited in 55 townships, most of which contained irrigated land. Dr. L.E. Tyner, Dominion Laboratory of Plant Pathology, Edmonton, again verified the presence of the disease by microscopic examination of specimens. The results of the survey may be summarized as follows:

District	Farms Visited	Farms Affected	Acreage Affected	Acreage not Affected	Total Acreage on Affected Farms
Lethbridge	700	216	1,712	340	2,052
Brooks	185	8	35	46	81
Calgary	40	6	21	2	23
Medicine Hat	15	2	1	1	2
Drumheller	10	3	6	9	15
Others	50	0	-	-	-
TOTAL	1,000	235	1,775	398	2,173

In 1942, the disease was known to be present in four separate districts of southern Alta. The chief centre was in the irrigated area that embraces Lethbridge, Taber, Raymond and Picture Butte, while slight infections were known to exist at Drumheller, Brooks-Rosemary and Medicine Hat (P.D.S. 22:54-55). The more intensive survey disclosed an increase in the number of affected farms. In addition, 6 affected fields were found near Calgary.

The areas where the disease was known to exist were designated as "pest areas" early in 1943 by the Alberta Department of Agriculture. Any grower living within an area so designated and wishing to grow potatoes beyond his own needs is required to obtain a permit from the Department authorizing him to plant potatoes. Only when a prospective grower had satisfied the Department that the seed he proposed to plant was likely to be free from ring rot was he given authority to plant. Growers who failed to obtain such authority are prohibited by law from moving any potatoes grown in the current year from their premises. The present survey was mostly among "authorized" growers.

These regulations, necessitating the planting of seed stocks believed to be completely free from ring rot did appear to accomplish one thing. There was a significant reduction in the intensity of the infection. Whereas the majority of the infected fields in 1942 showed from 20 to 50% of the plants diseased, this year the average number of diseased plants was close to 10%. Accordingly the crop was more marketable and loss to the individual farmer was less. Many growers, for the first time, have begun to realize the value of using clean seed and of employing sanitary measures (J.L. Eaglesham). Four fields in Alta. were rejected because they were diseased and 4 others because ring rot occurred in other fields on the same farm.

Bacterial ring rot was found in one city garden out of 30 examined at Saskatoon, Sask., Aug. 5-6; ring rot symptoms were not yet well developed. In the Pike Lake area, ring rot was found in one or more of the potato patches on 9 farms out of 12 visited on Aug. 16; 13 out of 30 plantings were diseased. (R.J. Ledingham)

Nine fields were rejected in Man. on account of bacterial ring rot in the field and 4 others because the disease occurred on the same farm (W.A. Cumming). In the spring of 1943, a survey was made of seed potatoes being planted by the growers; 242 samples of tubers were collected by the Agricultural Representatives. Bacterial ring rot was found in 20, or 8.3% of the samples

from 13, in part widely separated, localities. Other diseases were also very prevalent (S.W. Edgecombe, J.E. Machacek). In late September 44 fields grown by market gardeners were surveyed around Winnipeg, Portage la Prairie, Balmoral and Beauséjour. In each field 10 consecutive hills were dug. Rotting tubers were found in 27 fields, 11 of which proved to be due to bacterial ring rot (J.E. Machacek, W.A.F. Hagborg). The disease was also encountered in 4 out of 5 other samples received for identification. (W.A.F. Hagborg)

Eight fields in Ont. were rejected for bacterial ring rot in the field and 9 because it occurred on the same farm. In addition, Inspectors of Crops, Seeds and Weeds Branch, Ont. Department of Agriculture, found the disease on 160 farms, comprising about 1,400 acres of table potatoes, by Sept. 18, according to R.E. Goodin. Except in very obvious cases, samples were submitted for examination at Ottawa. (H.N. Racicot)

In 1943, 155 fields or 12% were rejected for bacterial ring rot in Que. out of 1,302 entered for certification, compared with 186 or 18% out of 1,057 inspected in 1942. The number of fields rejected because ring rot occurred on the same farm, dropped sharply, viz. from 92 in 1942 to 15 in 1943, the second year this regulation has been in force. In the Chicoutimi and Lake St. John districts, 94 fields out of 163 were rejected on account of ring rot in 1942. In the same districts, due to more attention to sanitary measures, only 9 fields out of 227 were disqualified because of ring rot in 1943. The disease is still persisting and spreading in table potatoes in Que. due largely to the use of contaminated implements and of uncertified, contaminated potatoes for seed (B. Baribeau). In N.B., 39 fields were rejected on account of bacterial ring rot in the field and 23 others due to the disease being on the same farm; in 1942 the figures were 80 and 47 respectively (C.H. Godwin). No information is available on the amount of bacterial ring rot in table stock in N.B. (I.L. Conners). Bacterial ring rot was not reported in 1943 in N.S. (W.K. McCulloch) or in P.E.I. (R.R. Hurst)

SOFT ROT (Erwinia carotovora). Affected tubers taken from a shipment of 300 bags of potatoes from Norfolk, Va. were received from W.A. Fowler, Toronto, Ont. "Practically all of the bags appear to be infected with a varying percentage of disease." (L.T. Richardson)

BLACK LEG (Erwinia phytophthora) affected 10% of the plants in a low lying field of Irish Cobbler at Cloverdale, B.C. (W. Jones). Black leg was fairly prevalent in central Alta.; 15% of the plants were affected in a field at Oliver (M.W.C.). Black leg was found in 5 out of 30 plantings examined in the Pike Lake area, Saskatoon, Sask.; the average damage was 4% (H.W.M.). Infection was severe at Winnipeg and St. Jean, moderate at Letellier and slight at Brandon, Man. (J.E. Machacek). Black leg was found in 17 fields out of 105 entered for certification; 4% of the plants were affected in one field, 2% in 2, and less than 1% in the others. (W.A. Cumming)

Black leg was again more prevalent in the Chicoutimi and Lake St. Jean districts than elsewhere in Que. Of the 28 fields rejected, 19 were from these districts, where the weather was cool and wet early in the season (B. Baribeau). Black leg was less prevalent in N.B. in 1943 than in the previous year; 3 fields were rejected on account of the disease (C.H. Godwin). Black leg was

less widespread in N.S. in 1943 than last year, but more disease was present in the affected fields. Black leg was found in 58 fields and it caused the rejection of 2 (W.K. McCulloch). In a survey of table stock fields in P.E.I., the average infection was 1.5% in 27 fields of Irish Cobbler and 0.5% in 58 of Green Mountain (R.R. Hurst). The disease caused the rejection of 43 (2.3%) of the fields entered for certification. (S.G. Peppin)

STEM-END ROT (Fusarium Solani var. eumartii) was not observed in Ont. in 1943 (J.W. Scannell). A slight infection was found in L'Islet Co., Que. (B. Baribeau). Two tubers of Early Ohio rather severely affected by stem-end rot or vascular necrosis were received from Truax, Sask. (H.N. Racicot)

WILT (Fusarium sp.) was found in 10 fields out of 105 entered for certification in Man.; in one field 2% of the plants were affected. (W.A. Cumming)

STORAGE ROT (Fusarium spp.) caused heavy losses in Green Mountain, Irish Cobbler and Katahdin in P.E.I., particularly in table stock, during the winter 1942-43. (R.R. Hurst)

RHIZOCTONIA (Pellicularia filamentosa (Rhizoctonia Solani). About 5% of the plants were affected in gardens at Saskatoon, Sask. on Aug. 5 (H.W.P.). Two tubers received from Truax were affected (H.N. Racicot). Rhizoctonia caused slight damage to the growing plants in most fields in Man. Sclerotia were abundant on the tubers in fields where digging was delayed, especially on the lighter soils. (W.A. Cumming)

Rhizoctonia caused only slight damage in fields entered for certification in Que., and development of sclerotia on the tubers was slight. It was slightly more prevalent in the Chicoutimi and Lake St. Jean districts than in 1942, due to late digging (B. Baribeau). Rhizoctonia caused some misses in the fields in N.B. at planting time; tuber infection was not unusual at harvest (C.H. Godwin). Rhizoctonia was less evident that in 1942 in N.S. It was reported in 40% of the fields of Katahdin, 35% of Irish Cobbler, 28% of Bliss Triumph and 27% of Green Mountain; it also occurred in Chippewa, Warba, Sequoia and Sebago. The average infection on the tubers was about 5% (W.K. McCulloch). Rhizoctonia affected on the average about 1.5% of the plants in 27 fields of Irish Cobbler and a trace in 58 fields of Green Mountain in P.E.I. Seed piece decay affected about 6% of the hills in one field in June. (R.R. Hurst)

PHOMA ROT (P. tuberosa). A very little of the rot was observed in April in P.E.I. (R.R. Hurst)

PINK ROT (Phytophthora erythroseptica). The organism was isolated from tubers grown at Kelowna, B.C., and its pathogenicity was proved. Typical pink rot symptoms develop in infected tubers. The disease is said to have appeared in spots in the field and caused a loss of about 30% of the crop. (W. Jones)

LATE BLIGHT (Phytophthora infestans) was less prevalent than usual in the coastal district of B.C. The disease appeared late in the season and little tuber infection occurred due to satisfactory weather at harvest. Possibly a severe cold period in the winter, which killed down volunteer plants, may have been responsible for its late development. (W. Jones)

Late blight was found for the first time in Alta. when the disease was noticed on vines at Edmonton, toward the end of Aug. It became rather prevalent in many fields in the district by early Sept. The disease was also observed on the foliage 60 miles south, 12 miles west and 25 miles east of Edmonton. A survey was made of the tubers in 90 fields and gardens in or near the city during harvest. Although the total loss was not large, in several instances 50% of the tubers were rotted and in one 30-acre field 42% were diseased. On the river flat, where conditions were apparently very favourable for the disease, both Netted Gem and white varieties were attacked with about equal severity. On the upland, where most of the crop is grown and over 95% of the acreage is in Netted Gem, serious rotting occurred only in the white- and red-skinned varieties. If the acreage of the latter varieties had predominated, the loss from late blight would have been large (M.W.C.). Late blight in epidemic form was present for the third successive year in Man. Severe loss of tubers was reported from potato growing areas north of Winnipeg along the Red River, particularly at Selkirk and East Selkirk. The disease occurred this year outside the Red River Valley at Great Falls, Steinback, Glenboro, Brandon, and Dauphin (W.A. Cumming). The disease was severe in 2 gardens in Winnipeg and at Golden Bay, moderate at Lac du Bonnet, and a trace at St. Jean and at Letellier, near the international border (J.E. Machacek). Late blight was severe in Ont. in 1943. Many growers sprayed or dusted their crop 8 to 10 times during the season, and obtained quite good control (J.W. Scannell). Affected tubers were received from 6 points including Harlowe (15% loss) and Halloway (50% loss). In the latter case the potatoes were dug 2 or 3 days after the tops were completely blighted. At that time very few tubers were rotten. (H.N. Racicot)

Late blight was reported in most potato districts in Que. from Abitibi to Gaspé, but it was most prevalent in the central part of the province. It was first reported on Aug. 3 in Labelle Co. and a few days later in the Eastern Townships. The potato foliage was completely destroyed near the St. Lawrence in Témiscouata Co. by Aug. 25 and in the Gaspé peninsula in the first few days of Sept. Heavy and frequent rains during the season made control difficult. The damage to the crop, especially about Montreal and in the northern part of the province, where rainfall was abundant, was severe, due to tuber rot. Late blight was found in 54% of the bins of seed potatoes inspected, infection varying from a trace to 37%, and averaging 1.2% (B. Baribeau). Affected specimens were received from 4 points in Que. (L.T. Richardson)

Late blight appeared early in N.B., and, owing to the weather being continually wet, spray operations were interfered with and the disease spread rapidly. However, little tuber rot was found (C.H. Godwin). Late blight was widespread and severe in N.S. It was first reported in Kings Co. on Aug. 7 and the foliage was destroyed in a great many fields by Aug. 17. The disease appeared in Colchester Co. and eastward about Aug. 19. An abnormally wet season kept the soil more or less water-logged, prevented the free use of sprayers, and upset growing conditions. Tuber rot, however, was only about 0.5%. In soils with a gravelly or sandy subsoil, crops of 300 to 400 bu. of sound tubers were harvested, but under less favourable conditions yields were much reduced. The average reduction in yield was estimated to be about 27% (W.K. McCulloch). Late blight was first recorded on July 25 in the western sections of P.E.I. Other outbreaks quickly followed from many other areas and by mid-

August, the vines were dead over a considerable acreage. The epidemic this year was most the destructive as far as our records go. The premature killing of the tops greatly reduced yields, although there was little loss from tuber rot in these fields. Tops that remained green as a result of ordinary spray applications eventually contracted blight and the crop suffered from severe rot. However, where applications of fungicide were made both ways in the rows at 5 to 7 day intervals and the tops were killed late in the season by means of chemicals, a good crop containing very little rot was harvested. (R.R. Hurst)

R. Bonde and E.S. Shultz (Me. Agr. Exp. Sta. Bull. 416. March, 1943) discuss "Potato refuse piles as a factor in the dissemation of late blight." They find that late blight infected tubers usually decay when planted, and of those that grow very few produce late blight infected plants and these plants rarely survive to cause infection. On the other hand, a high percentage of refuse piles develop late blight early in the season and if they are favourably located local epidemics are to be found in adjacent fields well in advance of the date spraying usually begins. They consider these dump piles are probably the most important centre for late blight dissemination and recommend that waste potatoes be burned or incinerated. This does not remove the possibility that there may not be some long distance spread of late blight as has been demonstrated for the spread of downy mildew of cucurbits.

SEED-PIECE DECAY (Chiefly Phytophthora infestans). Many fields in P.E.I. showed up to 15% rotted seed pieces in June. (R.R. Hurst)

SOFT ROT or LEAK (Pythium ultimum). Early in the season 2 car loads of potatoes shipped from Brooks, Alta., to Calgary were severely damaged and others were slightly affected. (L.E. Tyner)

SCLEROTINIA ROT (S. sclerotiorum) caused a decay of the stalks in 6% of the plants of Irish Cobbler in a low lying, 20-acre field at Cloverdale, B.C. (W. Jones). Every plant was severely affected in one plot of Irish Cobbler at Charlottetown, P.E.I. (R.R. Hurst)

SILVER SCURF (Spondylocladium atrovirens) was observed in a few lots of Irish Cobbler in the Gaspé peninsula, Que. (B. Baribeau). Silver scurf was found on 75% of the tubers of Katahdin when half a bag from Hartland, N.B. was examined on June 5. Infection was slight to moderate, affecting 5 to 35% of the surface. The determination was verified by inducing the fungus to fruit on the tubers in a moist chamber (H.N. Racicot). Silver scurf was reported during March and April on Irish Cobbler and Katahdin in N.S. The infection was generally slight, but it amounted to 15% in one case (W.K. McCulloch). Traces were found in the Laboratory storage, Charlottetown, P.E.I., in May, on Irish Cobbler, Katahdin, and Green Mountain. (R.R. Hurst)

POWDERY SCAB (Spongospora subterranea). Potatoes grown at Ohaton, Alta., from imported eye sets were infected (A.W. Henry). Powdery scab was prevalent only in Témiscouata Co., Que. The disease was found in 70% of the bins in the county, infection varying from 0.5 to 50% and averaging 5%. In other counties only a few tubers were found. The development of the disease seems to be correlated with the weather and the rotation followed. The spring, summer, and fall were very wet in Témiscouata (B. Baribeau). About 6% of the

tubers were affected in one field of Irish Cobbler and 20% in one of Bliss Triumph in N.S. (W.K. McCulloch). Two specimens of powdery scab in P.E.I. in Green Mountain were brought to the Laboratory. (R.R. Hurst)

WART (Synchytrium endobioticum). No cases of wart have been seen since the original case in 1941. Further trials were made this season of "English" potatoes; and the small garden in Halifax where the disease was found was kept under observation but not a trace of wart was seen. (W.K. McCulloch)

WILT (Verticillium albo-atrum). A severe infection was found in one planting at Calgary, Alta. It was observed in several other plots and was apparently very common (G.B. Sanford). Wilt was reported in 5 fields in N.S., with the average infection in the affected fields about 0.5%. In all cases, specimens were taken to the Laboratory of Plant Pathology for identification (W.K. McCulloch). Wilt was general in many fields of table stock in P.E.I.; it affected 22% of the plants in one field of Irish Cobbler. (R.R. Hurst)

WILT (Verticillium and Fusarium). Wilt was the major potato disease at Saskatoon in 1943. Dry conditions, and the light texture of much of the soil probably aggravated the trouble. The disease was present in 14 out of 20 city gardens at Saskatoon, with average damage 20%; it was present in 9 out of 30 plantings in the Pike Lake area with average damage of 5%. Where isolations were made Verticillium was the principal organism isolated. (R.J. Ledingham)

CALICO (Solanum virus 10). One plant of Green Mountain was found in a plot at the Station, Fredericton, N.B. The virus was transmitted by sap inoculation to Datura Stramonium, Solanum nodiflorum, Capsicum annum, Nicotiana Tabacum and Lycopersicum esculentum, in which it produced the characteristic symptoms of calico virus, Solanum virus 10. (D.J. MacLeod)

LEAF ROLL (virus). Disease caused more loss in potatoes than in any other crop in Victory gardens on Vancouver Island, B.C. Leaf roll and mosaic were the most important, mainly because of an insufficient supply of certified seed (W.R. Foster). Leaf roll was very serious and widespread in Alta. and was especially noticeable in city gardens (G.B. Sanford). Leaf roll affected 8 out of 30 gardens at Saskatoon, Sask.; 5% of the plants were affected (H.W.M.). Four fields entered for certification were rejected on account of the disease in Man. Two were fields of Chippewa and one of Sequoia planted with seed grown in Man. in 1942; there was a sharp increase in the incidence of the disease over the readings of the previous year. The fourth field was planted with Irish Cobbler seed obtained from the Maritimes (W.A. Cumming). Leaf roll affected 20% of the plants at Plum Coulee (J.E. Machacek). Leaf roll appears to be increasing in Que. In all, 209 fields out of 1,302 inspected were rejected in 1943, an increase of 4.6% over the corresponding figures of the previous year. The weather was dry and aphids abundant in 1942. It should also be noted that many fields that were rejected were planted with seed from car load lots imported into the province. In some districts every field planted with this seed was rejected on account of leaf roll (B. Baribeau). In N.B., leaf roll was present in smaller amounts in the fields inspected for certification in 1943, but more fields were affected than in the previous year. In all, 485 fields were rejected for leaf roll, an increase over 1942 (C.H. Godwin). Leaf roll (Solanum virus 14) was found in 2 plants of Solanum Jamesii

in an experimental plot at the Laboratory, Fredericton, N.B. (D.J. MacLeod). A further increase of leaf roll occurred in N.S. in 1943; 44 fields out of 346 were rejected (W.K. McCulloch). In P.E.I., out of 4,260 fields, 1,174 or 27.6% were rejected on account of leaf roll, whereas last year 14.4% were rejected (S.G. Peppin). The disease was also prevalent in table stock; the average infection was 13% in 27 table stock fields of Irish Cobbler and 47% in 58 fields of Green Mountain. (R.R. Hurst)

A Roll and Streak of virus origin was present in seedlings at the Station, Fredericton, N.B. The disease causes a rolling of the leaves resembling leaf roll and a discontinuous streaking of the stems. In some seedlings the streaking was lacking. In some plants the lower and middle leaves collapsed and fell off the plant. The disease is tuber-borne and in some seedlings the rolling and streaking recurred in the second generation plants. The rolled leaves are usually stiff, but not as brittle as in true leaf roll. The disease was transmitted by grafting to Irish Cobbler, Katahdin, and four seedlings. All attempts to transmit the virus by sap inoculation failed. (D.J. MacLeod)

MOSAIC (virus) was present in 5 out of 20 city gardens at Saskatoon and in 13 out of 30 plantings in the Pike Lake area; the average infection was about 5% (H.W.M.). Mosaic was recorded in 14 out of 105 fields entered for certification in Man.; 1% or less of the plants were affected (W.A. Cumming). A moderate to severe infection of mild mosaic was seen at Fort Whyte, Man., and slight to moderate infection of mosaic occurred at Letellier, Plum Coulee and St. Jean (J.E. Machacek). In Que., 182 fields or 14% were rejected on account of mosaic as against nearly 3% in 1942. The increase was in districts where certified seed was brought in from outside the province in 1943; aphids were also abundant in 1942 (B. Baribeau). Mosaic developed unexpectedly in N.B. in Aug., when the weather was cool. The outbreak was more pronounced in Green Mountain and Bliss Triumph than other varieties. It was more serious than during the previous 5 years (C.H. Godwin). There was also an increase of mosaic in fields of certified stock in N.S.; it was found in 40% of the fields and 33 or nearly 10%, were rejected (W.K. McCulloch). In P.E.I. 378 fields out of 4,260 were rejected for mosaic (S.G. Peppin). In table stock fields, the average infection was 37% in 27 fields of Irish Cobbler and 56% in 58 fields of Green Mountain. (R.R. Hurst)

PURPLE DWARF. Several affected plants were present in the Laboratory disease nursery. (G.B. Sanford)

PURPLE TOP or BUNCH TOP (virus) showed up late in the season in Katahdin in Ont. (J.W. Scannell). Purple top was not as prevalent in 1943 in N.B. as last year (C.H. Godwin). Bunch top was common in Katahdin and several new seedlings at the Fredericton Station and the Alma Substation. In most cases the plants showed a purpling or yellowing of the foliage. Symptoms were severe in a few seedlings without loss of their normal green colour. Tubers from six seedlings showing severe symptoms in turn produced severely diseased plants indicating that the disease is tuber-borne. Bunch top was transmitted 8 times to healthy seedlings by grafting. The virus was also transmitted by grafting to Datura Stramonium, Nicotiana rustica and Lycopersicum esculentum. A severe distortion of the foliage and a vein clearing was produced on these hosts

(D.J. MacLeod). Purple top was much less in evidence in N.S. than last year; it was reported in Katahdin only, with an average infection of 0.5% in 9 fields (W.K. McCulloch). Very little purple top was seen in 1943 in P.E.I.; it was observed in two varieties, Green Mountain and Katahdin. The disease, however, had one important effect in 1943. As pointed out last year (P.D.S. 22:61) tubers from affected plants were often flabby and a considerable proportion of the tubers in last year's crop were so affected. When these tubers were planted they failed to produce sprouts. In consequence, there was a very high percentage of misses in fields of Katahdin and Green Mountain. (R.R. Hurst)

SPINDLE TUBER (virus). Two fields planted with the same seed were rejected in Man. on account of the sharp increase of spindle tuber over 1942 (W.A. Cumming). The disease was found in many districts of Que., but the average percentage of affected tubers was low (B. Baribeau). Spindle tuber is still quite common in Irish Cobbler in N.B.; 4 fields were rejected (C.H. Godwin). Spindle tuber was not reported in the field in N.S., but many pear-shaped tubers of Katahdin and cylindrical ones of Irish Cobbler were seen during grading. (W.K. McCulloch)

WITCHES' BROOM (virus) was observed in one planting in the Pike Lake area, near Saskatoon, Sask. (H.W.M.). The disease affected 4% of the plants of Irish Cobbler in one small field in Queens Co., P.E.I. (R.R. Hurst)

YELLOW DWARF (virus) was noted in one field of Dooley in Ont. (J.W. Scannell). According to "The Packer" of Aug. 7, 1943, experiments by S.G. Younkin, Ithaca, indicate that the daisy (?Chrysanthemum Leucanthemum) is the most important over-wintering host for yellow dwarf; 45% of the daisy plants in test fields were infected. Out of 136 other plants tested, 44 were found susceptible, but none showed more than 3% infection; clover is an unimportant host. When the hay is cut, the leaf hoppers migrate to the potatoes. If daisies cannot be controlled or avoided, resistant varieties such as Katahdin and Sebago should be planted. Green Mountain and Rural are most susceptible. Infected daisies have dwarfed, curled and deformed leaves, but later the plants recover and show no symptoms except for small size.

BLACK HEART (non-parasitic) affected nearly all the tubers in a seed lot from the Scott area, Sask. (H.W.M.). An occasional affected tuber was seen in May in Queens Co., P.E.I. (R.R. Hurst)

CHEMICAL INJURY. A portion of a local 1943 crop stored at Saskatoon, Sask., in salt bags had darkened areas next to the sacking (H.W.M.). Examination at Quebec City by B. Baribeau, of a carload of Green Mountains grown in P.E.I., revealed that the tubers, in the bottom layer of bags, and in contact with the floor, were burned by a chemical believed to be common salt. (H.N. Racicot)

GIANT HILL was observed in a few fields in Que. (B. Baribeau). Giant hill was not conspicuous in N.S. in 1943; it was reported in one field of Green Mountain (W.K. McCulloch). An occasional hill was seen during the survey of fields of table stock in P.E.I. (R.R. Hurst)

CONTACT FROST and LOW TEMPERATURE INJURY. The Division was consulted in six cases of injury in seed potatoes. In some cases the injury was due to contact frost at the time the potatoes were dug in 1942 or to low temperature during storage or transport. An additional six cases were seen in the 1943 crop, mostly due to freezing temperatures before shipment. Only in one shipment was it clear that injury occurred during transit (H.N. Racicot, L.T. Richardson). Low temperature injury caused severe losses in both table and seed potatoes during the fall and winter of 1942-43. (R.R. Hurst)

FROST. A heavy frost at the end of October damaged the crop in most districts of Que, (B. Baribeau)

HOLLOW HEART (non-parasitic) occurred occasionally in some fields on Katahdin and Green Mountain in P.E.I. (R.R. Hurst)

INTERNAL BROWN SPOT (non-parasitic) caused considerable damage in one lot of potatoes from Scott, Sask. (H.W.M.)

LIGHTNING INJURY. Affected plants were received from Sterling, Ont. The affected area was about one square rod in extent. (L.T. Richardson)

MAGNESIUM DEFICIENCY was severe on Green Mountain in an experimental plot at the Station, Fredericton, N.B. In some cases the foliage was completely destroyed. Katahdin and two of the new seedlings growing in the same plot showed only a trace of injury indicating that these potatoes are somewhat resistant to the disease (D.J. MacLeod). Magnesium deficiency affected many fields throughout P.E.I. and caused widespread and serious damage. Magnesium sulphate sprayed on along with each Bordeaux application at the rate of 10 lb. per 80 gallons gave good control. Some of the factors in this unprecedented outbreak were: (1) excessive soil acidity; (2) heavy applications of acid-forming fertilizers lacking magnesium; (3) low organic content; (4) leaching out of magnesium by prolonged rains. (R.R. Hurst)

NET NECROSIS was found in a few bins on the Lower St. Lawrence, Que.; a slight infection was observed in a few tubers only (B. Baribeau). The trouble is still quite severe in Green Mountain in N.B. and for the first time, to our knowledge, it has been observed in Irish Cobbler. (C.H. Godwin)

POTASSIUM DEFICIENCY was present in many fields of table stock in P.E.I.; 11% of the plants were affected in one field. (R.R. Hurst)

SPINDLING SPROUT was observed in tubers of Bliss Triumph in N.B.; this condition may be associated with leaf roll. (C.H. Godwin)

SPRAIN was seen in one lot of tubers of the 1942 crop brought to the Laboratory, Charlottetown, P.E.I. (R.R. Hurst)

STEM-END BROWNING was seen in a few lots of seed potatoes in the spring, 1943, but the discoloration did not penetrate more than $\frac{1}{4}$ of an inch into the tuber (B. Baribeau). The trouble still appears in Green Mountain in N.B., but the infection is a more moderate type than formerly (C.H. Godwin). Two cases were reported in May, 1943 in P.E.I.; it was not seen up to Oct. in the 1943 crop. (R.R. Hurst)

SUN SCALD. Considerable sun scald was seen in P.E.I. in many fields of the chief varieties. (R.R. Hurst)

TIP and HOPPER BURN was observed in specimens received from Strathroy, Owen Sound, and York Mills, Ont. (L.T. Richardson)

PUMPKIN

POWDERY MILDEW (Erysiphe Cichoracearum) was found on some plants in the merit trial plots at the Station, Summerland, B.C. (G.E. Woolliams)

RADISH

CLUB ROOT (Plasmodiophora Brassicae) severely affected all the plants in a planting in Queens Co., P.E.I. on July 25. (R.R. Hurst)

YELLOWS (Callistephus virus 1). A trace was found in a garden in York Co., N.B.; the disease caused a sterility similar to that in turnip. (D.J. MacLeod)

RHUBARB

CROWN GALL (Agrobacterium tumefaciens) was found on a single plant in a home garden, Summerland, B.C. (G.E. Woolliams)

LEAF SPOT (Ascochyta Rhei). Moderate infection on the leaves of some plants at Morden, Man.; spores 7.5-12 x 3 microns. (W.L. Gordon)

LEAF SPOT (Phyllosticta straminella). A light infection occurred on rhubarb leaves at the Botanical Garden, Montreal, Que. (J.E. Jacques)

LEAF SPOT (Ramularia Rhei) was fairly heavy on the variety Strawberry in a planting in Queens Co., P.E.I. (R.R. Hurst)

CROWN ROT (bacteria associated) caused considerable damage to certain clumps at Morden, Man.; reddening of the leaves was pronounced. (W.L. Gordon)

SALSIFY

WHITE RUST (Cystopus cubicus) was moderate on Mammoth Sandwich Island at the Botanical Garden, Montreal, Que. (J.E. Jacques)

SPINACH

LEAF SPOT (Cercospora sp. inedit). A leaf spot was collected on the upper leaves of seed plants of Bloomsdale spinach at Pied de la Montagne, Que., by Paul Bertrand, Seed Inspector, in Sept. Examination revealed a Cercospora. Chupp (in litt.), to whom material was sent, says, "I agree with

you that it is not C. beticola (C. Spinaciae, C. flagelliformis, or C. spinacicola), but I also believe it is not C. dubia." He characterized the species as follows: "Leaf spots circular to angular, 0.5-3 mm. in diameter, dark olivaceous to grayish brown, occasionally with reddish brown margin; fruiting amphigenous; stromata slight to 40 microns in diameter, pale to medium brown; fascicles mostly dense, compact to divergent; conidiophores pale to very pale brown, paler and more narrow toward the tip, rarely septate or branched, straight to curved, 0-1 abruptly geniculate, subtruncate tip, 3-5 x 10-40 microns; conidia hyaline, cylindric to almost acicular 3-7 septate, straight or slightly curved, truncate to subtruncate base, obtuse tip, 3-5.5 x 15-65 microns." In common with C. dubia on Atriplex (P.D.S. 19:32) and Chenopodium the conidia are mostly cylindric with obuse tips, but they contain more septa and both conidia and conidiophores are less robust than those of C. dubia. (I.L. Conners)

DOWNY MILDEW (Peronospora Spinaciae) was general in one seed crop at Cadboro Bay, B.C., and caused considerable injury to the foliage (W. Jones). The disease was general and caused slight to moderate damage on Vancouver Island (W.R. Foster). A slight infection was observed at Morden, Man. (J.E. Machacek)

SCLEROTINIA ROT (S. sclerotiorum) affected 10% of the stems in one planting in Queens Co., P.E.I. (R.R. Hurst)

LEAF SPOT (Stemphylium botryosum) was fairly general on the seed crop at the Station, Sidney, B.C. The spots varied from small to large, roughly circular, light brown to cream coloured, few to many. The fungus was amphigenous. (W. Jones)

MAGNESIUM DEFICIENCY was general in many plantings in Queens Co., P.E.I. (R.R. Hurst)

SQUASH

STORAGE BREAKDOWN (Botrytis and Fusarium). Market gardeners throughout N.B. suffered much loss this year due to breakdown of squash caused primarily by Botrytis and Fusarium. Apparently the fungi gained entrance through wounds. (J.L. Howatt)

POWDERY MILDEW (Erysiphe Cichoracearum) was found on several varieties of squash in the merit trial plots at Summerland, B.C. (G.E. Woolliams)

SWEET CORN

RUST (Puccinia Sorghi). Traces were observed on Golden Bantam and Golden Giant sweet corn in Queens Co., P.E.I. It was also general on fodder corn, causing considerable damage, at the Station, Charlottetown. (R.R. Hurst)

SMUT (Ustilago Zeae). A trace was found in one planting out of 10 examined in Sask. (H.W.M.). Smut was severe in garden and field at Morden, Man., while infection was moderate at Brandon (W.L. Gordon). The disease was general but not severe in Lincoln Co., Ont. (J.K. Richardson). About 5% of the ears were smutted in a late-sown, thickly planted garden patch in Westboro, Ont.; a little

was seen in an earlier planting (D.B.O. Savile). A specimen for identification was received from Montreal, Que., from a planting where 15% of the plants were said to be affected (J.E. Jacques). A trace was found in Golden Bantam at Canard, N.S. (J.F. Hockey). An occasional infected plant of Golden Bantam was seen in Queens Co., P.E.I. (R.R. Hurst)

LEAF SPOT. A severe infection of an unknown leaf spot was seen at Morden, Man. Isolations yielded Helminthosporium halodes, H. sativum and Alternaria sp., det. J.E. Machacek. (W.L. Gordon)

SWEET POTATO

ROT (Pythium sp.). Quite a number of roots grown locally in Lincoln Co., Ont., showed small lesions at harvest, which spread rapidly at room temperature. (J.K. Richardson)

ROT (Rhizopus sp.) completely rotted roots, with mycelium abundant internally and sporangia with hyphae in mats on the outside, were received from Can. National Railways at Saskatoon, Sask. (H.W.M.)

TOBACCO

The account given below by Dr. L.W. Koch was the result of surveys of the old and new tobacco belts of Ont. conducted by him at various times during the past year. Information concerning the Que. tobacco-growing districts was supplied to him by Mr. R. Bordeleau of the Experimental Station, L'Assomption, Que.

Diseases in the Seedbed

YELLOW PATCH (unbalanced fertilization) was again the most important disease of tobacco seedlings in both the old and new tobacco belts of Ont. Damage varied widely. In Essex Co., numerous seedbeds were mildly affected, showing patches of chlorotic, stunted seedlings, some of which recovered in time for transplanting. In both tobacco belts, some cases of severe damage were either observed or reported in which seedlings in all or the greater portion of seedbeds were destroyed. The application of "high nitrogen" fertilizers was definitely assigned as the cause in some instances.

BLACK ROOT ROT (Thielaviopsis basicola) caused only mild damage in seedbeds of Essex Co., Ont. In the Woodslee district, several cases of severe infection were noted in beds which were imperfectly drained. In certain localities of Norfolk Co., mild infection was present in some seedbeds. An attempt was made to locate the source of infection as it seems to recur each year in the same areas. Such seedlings are almost invariably overlooked and transplanted to the field.

DOWNY MILDEW or BLUE MOULD (Peronospora tabacina) was reported in seedbeds of two widely-separated areas (35 miles) in Essex Co., Ont. Damage was moderate in each case. Eradication of affected seedlings was practised

in both cases, though in the one instance transplanting to the field was completed before the disease was identified.

DAMPING-OFF (Rhizoctonia and Pythium sp.). Damage from damping-off was severe in many seedbeds of Essex and Kent Counties, Ont. Its severity was due largely to excessive rainfall early in the season, which kept practically all cloth-covered burley seedbeds too wet. For the same reason, the disease took a heavy toll of seedlings in parts of Que.

BLACK LEG (Erwinia ?aroideae). Two cases of black leg were recorded near Cottam, Ont., where the disease was confused with damping-off by the growers.

CHLOROSIS (chilling) was widespread in Essex Co., Ont., during a short period when there was little sunshine and night temperatures were sub-normal. So far as observed, all seedlings recovered.

NEMATODES (Heterodera marioni). Patches of affected seedlings in one seedbed of the old tobacco belt, Ont., were recorded.

MUSHROOMS. Fleshy fungi caused some damage in seedbeds in the Blenheim-Ridgetown area of Kent Co., Ont. In some seedbeds mushroom growth was traced to the use of small amounts of manure as a base for the seedbed soil.

Diseases in the Field

MOSAIC (virus). In Norfolk Co., Ont., mosaic caused considerable damage in fields where two successive crops of tobacco were grown. Elsewhere in the same district damage varied from a trace to moderate. In Essex County, two cases of severe infection were reported in fields both of which were in tobacco for the second year and were also apparently infected by mosaic the previous year. The usual amount of infection was also reported from the tobacco-growing districts in Que.

STREAK (virus). A scattered infection was observed in burley fields in the Blenheim district of Kent Co., Ont.

RING SPOT (virus) caused local damage in some fields of burley tobacco in Essex Co., Ont.

SORE SHIN (Rhizoctonia Solani) caused severe damage in many fields of Essex Co., Ont., particularly in the Oxley-Colchester district. This disease has been increasing in prevalence and severity for several years and damage continued so late during the past year that almost mature, affected plants frequently broke off at the base of the stem after windstorms. Infection up to 10% was recorded in fields of flue-cured tobacco.

Unusually severe damage was also recorded in Que. on shade-grown cigar leaf tobacco in the Abbotsford district.

BLACK ROOT ROT (Thielaviopsis basicola) caused moderate damage on susceptible varieties in both the old and new tobacco belts of Ont. Total damage

was mild in Essex Co. because of the high percentage of the resistant variety, Harrow Velvet, grown. In a field test for varietal resistance in the Delhi District, Silver Dollar was again the only variety showing a fair measure of resistance.

NEMATODES (Heterodera marioni) were observed on the roots of stunted plants in one field in Norfolk Co., Ont. Damage was slight.

ANGULAR LEAF SPOT (Pseudomonas angulata). Damage from angular leaf spot was slight in both Ont. and Que. This was probably due in part to the unsual drought in Ont. during the latter part of the season.

BROWN ROOT ROT (cause undetermined) was not widespread in Ont. during the past year, although where it did occur, it was severe. The varieties Halley's Special and Harrow Velvet were most severely affected. Total damage was moderate.

DOWNY MILDEW or BLUE MOULD (Peronospora tabacina) was present in one field where infected plants were transplanted. Infection resulted in large chlorotic spots up to $\frac{1}{2}$ inch in diameter on the lower leaves. Affected leaf tissues finally dropped out giving rise to a shot-hole symptom. Infection did not appear to spread and high temperature appeared to arrest development of the leaf spot in most cases.

TOMATO

EARLY BLIGHT (Alternaria Solani) was fairly general in a seed crop at Duncan, B.C.; it caused considerable damage to the foliage and, as a canker, to many of the stems (W. Jones). A slight infection was observed at Edmonton, Alta. (M.W.C.). Early blight was fairly general on both staked and field crops in Lincoln Co., Ont., but it did not appear to cause any appreciable decrease in yield (J.K. Richardson). The disease became general in the Annapolis Valley, N.S., by Aug. 10, and caused severe defoliation in some plantings (J.F. Hockey). Early blight was heavy in one planting in Queens Co., P.E.I., in Sept. (R.R. Hurst)

Alternaria tenuis was found fruiting on the occasional blemish on tomato fruits on Aug. 25 at Centreville, N.S. (J.F. Hockey)

GREY MOULD (Botrytis cinerea). Up to 10% of the plants were affected by a stem girdling resulting in the death of plants in some greenhouse crops of New Improved Vetomold in Essex Co., Ont. Infection was evident 7-10 days after inoculation. (L.W. Koch)

LEAF MOULD (Cladosporium fulvum). New Improved Vetomold, V121, is being grown by nearly every grower of greenhouse tomatoes in the Victoria district, B.C. It has proved resistant to leaf mould and the growers are well pleased with the variety (W.R. Foster). This variety was widely planted in Ont. during the fall of 1943 and showed a high degree of resistance to leaf mould. Only traces of the disease were seen in a few Leamington greenhouses (L.W. Koch). Although leaf mould was a problem in greenhouse tomatoes in the Niagara peninsula in 1942-43, little damage was encountered where Vetomold

was grown (J.K. Richardson). An affected specimen was received from Fort William (L.T. Richardson). Moderate infection occurred on greenhouse tomatoes at Berwick, N.S. except where Vetomold was grown (J.F. Hockey). A heavy infection was seen in a section of a greenhouse in Queens Co., P.E.I. (R.R. Hurst)

ANTHRACNOSE (Colletotrichum phomoides). Fruits brought in from more than one garden at Ottawa, Ont., to ripen indoors became affected. (J.W. Groves)

BACTERIAL CANKER (Corynebacterium michiganense) suddenly appeared in epiphytotic form among field tomatoes at Vernon, Kelowna, and Westbank, B.C., after being quiescent for two years; 33-90% of plants were wilting and dying in one planting examined on July 26, at Vernon (G.E. Woolliams). Bacterial canker destroyed 10,000 plants of Grand Rapids in a commercial greenhouse in Saskatoon, Sask. The disease became epidemic only after the plants were well advanced. The grower began to discard the plants on Oct. 15, while ordinarily harvesting would have started Nov. 1. The organism was isolated from the specimens by W.A.F. Hagborg; "the isolates conformed to the description of Corynebacterium michiganense and were capable of causing typical bacterial canker on tomato plants in the greenhouse" according to him. (R.J. Ledingham)

Diseased leaves collected by Frère M. Anselme on Aug. 24 at Mont Rolland, Que., were found to be affected by bacterial canker. The determination was confirmed by smear preparation by D.B.O. Savile. (I.L. Conners)

WILT (Fusarium sp.) caused severe damage in quite large localized areas in 2 greenhouses in Middlesex Co., Ont., on July 15. These areas were 10 to 15 ft. in radius from the infection centre (J.K. Richardson). Diseased specimens were received from W.A. Fowler, Inspector, at Toronto (L.T. Richardson). Wilt (F. oxysporum) caused moderate loss in 2 gardens at Saskatoon, Sask. The seedling plants in both cases were obtained from the same source (H.W.M.). An affected plant received from the Montreal district, Que., developed F. Equiseti when placed in a moist chamber. (L.T. Richardson, J.W. Groves)

ROOT KNOT (Heterodera marioni) caused moderate damage in a greenhouse at Drumheller, Alta. This is the first record for Alta. (A.W. Henry)

LATE BLIGHT (Phytophthora infestans). The pathogen was isolated from a fruit rot that started in the field at Edmonton, Alta., and continued in storage, where it caused severe losses. Severe rotting of green and ripe fruit also occurred in a commercial greenhouse which was open during the fall and was nearly surrounded by a planting of potatoes severely infected with late blight (G.B. Sanford). The lower leaves were severely blighted on tomato plants growing along side a patch of blighted potatoes at Winnipeg, Man.; the green fruit, when picked and placed in storage, developed rot (J.E. Machacek). Some fruit rot was observed in a few fields in Lincoln Co., Ont., but the disease was of little economic importance (J.K. Richardson). Diseased specimens were received from several Ont. points; at Sioux Lookout, 7 bu., harvested green on Sept. 15 and stored away to ripen, were a total loss, and all the tomatoes in the town appeared to be similarly affected (H.N. Racicot). Late blight was reported from various places in Que. as having been very severe. All varieties seem to be equally susceptible. Loss was considerable in some fields, where 50% of the crop was discarded on account of fruit rot (C. Perrault). Diseased specimens were

received from 5 places; at Arundel one grower stated that he had lost all his tomatoes for the past 3 years from this cause (L.T. Richardson). Late blight caused very heavy losses to tomato growers throughout N.B.; losses were light, where the plants were adequately protected by spraying with Bordeaux Mixture (J.L. Howatt). Late blight was first observed on the foliage in N.S. on Aug. 10, and on the fruit on Aug. 25. Loss was heavy in a few plantings, but good control was obtained in sprayed plantings until the final picking. Up to 15% of the green fruit placed in storage developed rot (J.F. Hockey). Late blight caused heavy losses in Queens Co., P.E.I., and was reported to have been destructive in the other counties. (R.R. Hurst)

FRUIT ROT (Phytophthora parasitica). A slight infection was seen on Abel at the Station, Sidney, B.C. in July (W. Jones). A grower lost almost the entire crop from the first 3 trusses of fruit in a crop of Vetomold and Globelle at London, Ont., in June; in one picking he discarded 30 bu. of fruit, when tomatoes were selling at 30¢ per lb. (J.K. Richardson)

BACTERIAL SPECK (Pseudomonas tomato) was slight to severe on the fruit at Morden, Man.; a slight to moderate infection was also noted on several varieties at St. Vital and Winnipeg. (J.E. Machacek)

DAMPING-OFF (Rhizoctonia Solani) occurred on various varieties in a greenhouse at Winnipeg, Man.; the soil was deficient in phosphorus (J.E. Machacek). Damping off affected 65% of the plants in seed flats in a greenhouse in Queens Co., P.E.I., in February; the attack was checked by reducing moisture, adjusting the ventilation and raising the temperature of the greenhouse. (R.R. Hurst)

SCLEROTINIA ROT (S. sclerotiorum) caused slight to moderate rotting in one planting at Edmonton, Alta.; the pathogen was isolated. (M.W. Cormack)

LEAF SPOT (Septoria Lycopersici). Infection was moderate at Hamiota and Winnipeg, Man.; and severe at Gilbert Plains (J.E. Machacek). Infection was slight at Morden, but severe on the lower leaves at Brandon. Spores were 37.5-67 x 3.5-4 microns (W.L. Gordon). Leaf spot caused severe damage toward the end of the harvesting period in Essex Co., Ont. In certain fields the new variety, Bounty, appeared to be extremely susceptible (L.W. Koch). The disease also became general late in the season in Lincoln Co. (J.K. Richardson). A severe infection was observed on Bounty in Durham Co. on Sept. 1; the plants were being defoliated and 40% of the fruit was unmarketable. The variety appears to be extremely susceptible (G.C. Chamberlain). A trace was recorded in Queens Co., P.E.I. in Sept. (R.R. Hurst)

WILT (Verticillium albo-atrum). A slight infection was observed in a few greenhouses in the Victoria district, B.C. (W. Jones). Verticillium wilt was recorded for the first time in the Okanagan Valley, B.C., when it was observed in the Vernon district and in the verification trial plots at Summerland. Usually over 50% of the plants were affected. It is thought to have been introduced on the seed (G.E. Woolliams). The disease caused moderate damage in greenhouses in P.E.I. in March. (R.R. Hurst)

BASAL ROT (undetermined fungus) was found in a greenhouse in Middlesex Co., Ont.; several rows were severely infected while others on either side were growing vigorously and producing a good crop of fruit. (J.K. Richardson)

FERN LEAF (?cucumber mosaic virus). A single infected plant was observed at Brandon, Man.; it was stunted and bore no fruit. (W.L. Gordon)

MOSAIC (virus) was present in 60% of the greenhouses of Chinese growers in the Victoria district, B.C. (W.R. Foster). A severe infection of a single plant was noted in a garden at Winnipeg, Man. (W.L. Gordon). Mosaic continues to be a problem in greenhouses in Lincoln Co., Ont., in spite of apparently careful cultural practices. Up to 5% of diseased plants had to be rogued out from a number of varieties being grown for seed (J.K. Richardson). Traces only were present in several gardens at Charlottetown, P.E.I. (R.R. Hurst)

PURPLE TOP (virus). A trace of purple top was found in a field in Sunbury Co., and in a garden in York Co., N.B. This disease was repeatedly transmitted to tomato by grafting. The virus was also successfully transmitted to Datura Stramonium and Nicotiana rustica in which it gave rise to a clearing of the veins and a severe distortion of the foliage. In N. rustica, a large number of axillary shoots were formed, giving the plant a bushy effect (D.J. MacLeod). Traces were observed in gardens at Charlottetown, P.E.I. (R.R. Hurst)

BLOSSOM-END ROT (non-parasitic) was found in 2 out of 15 plantings in Sask. (H.W.M.). A moderate to severe infection was present in the Winnipeg area, Man. (J.E. Machacek). Entire sets of fruits were affected in some Leamington, Ont. greenhouses. In all houses the disease was transitory and indicated uneven watering (L.W. Koch). A slight amount of blossom-end rot was present in the plots at Ste. Anne de la Pocatière, Que. (R.O. Lachance). This trouble was not abundant this year in P.E.I.; however, in one garden at Charlottetown, 75% of the fruit was affected. (R.R. Hurst)

BLOTCHY RIPENING (non-parasitic) was present in 2 greenhouses at Gordon Head, B.C.; one grower obtained good control by applying a heavy dressing of potash and by watering heavily in the early growth stages. (W.R. Foster)

TURNIP

SCAB (Actinomyces scabies). A slight, fairly general infection was observed on Swede turnips at Edmonton, Alta. This is a new record for Alta. (G.B. Sanford)

GREY LEAF SPOT (Alternaria Brassicae). A moderate infection occurred in a garden at Edmonton, Alta. This is a new record for Alta. (L.E. Tyner)

WHITE LEAF SPOT (Cercosporella Brassicae). A slight infection was noted in one field of Laurentian in Waterloo Co., Ont. (J.K. Richardson)

SOFT ROT (Erwinia carotovora). A 2-acre field of Laurentian was a total loss near Tavistock, Ont., due to soft rot and black rot; both diseases were severe and many plants were infected with both diseases. (J.K. Richardson)

POWDERY MILDEW (Erysiphe Polygoni). A heavy infection was observed on Laurentian at Summerside, P.E.I.; the damage was thought to be considerable as the plants evidently lacked vigour. (R.R. Hurst)

DOWNY MILDEW (Peronospora Brassicae). Infection was general on all seed crops examined and caused slight damage to the lower leaves in the coastal areas of B.C. (W. Jones)

CLUB ROOT (Plasmodiophora Brassicae) destroyed the entire crop of a planting of Hazard's Improved in Queens Co., P.E.I. (R.R. Hurst)

STORAGE ROT (Rhizoctonia Solani) was observed on turnips in storage in Sask. R. Solani was obtained in pure culture by plating pieces of tissue from the margin of affected areas. Possibly wire-worm injury provided an avenue for the entrance of the Rhizoctonia. (R.J. Ledingham)

WILT (Sclerotinia sclerotiorum). A trace was found on seed stock of Ditmars at Deep Brook, N.S. (J.F. Hockey)

BLACK ROT (Xanthomonas campestris). Infection was severe on Swede turnips in the early crop in Oxford and Middlesex Counties, Ont., where the fields were grown from untreated seed. Very few plantings, however, showed appreciable amounts of the disease where the seed had been disinfected. The crops that were still standing in late October showed much less disease than the early harvested fields, but many of the leaves were yellowing and dying due to poor growing conditions (J.K. Richardson). A few affected roots of Acadia and Laurentian were found at the Agr. College, Truro, N.S., at harvest and were sent to the Laboratory for examination (J.F. Hockey). There appears to be very little black rot in P.E.I., although traces have been found in Laurentian, Millpond, Hazard's Improved and other varieties. The disease was positively identified in each case by isolation of the pathogen. In one instance the organism was cultured from infected seed pod pedicels. Fearing trouble from this disease, we treated all foundation seed used in P.E.I. by the hot water method and distributed Ceresan to all seed growers, most of whom used it to treat their own seed. For this reason very little disease might be expected in this year's plantings, which fact is borne out by our survey. (R.R. Hurst)

FALSE BLOSSOM and STERILITY (virus). A trace of this disease was found in 6 fields in York Co., N.B. The disease was transmitted by grafting to healthy turnip; it is believed to be of virus origin. The virus resembles Callistephus virus 1. When the virus was introduced by grafting, the earliest symptoms were a clearing of the veins of the youngest leaves. This vein clearing was of short duration, 1 to 2 weeks. The secondary symptoms, distortion of floral structure and sterility followed in about 30 days. (D.J. MacLeod)

BROWN HEART or WATER CORE (boron deficiency) was sporadic in occurrence in the Guelph district, Ont., and possibly was not as prevalent as in other years. Development of water core was prevented by spraying the leaves with a borax solution on more than 250 acres of Swede turnips in various parts of western Ont. In 7 of the sprayed fields, containing 46 acres, adequate checks were left. Examination of the checks revealed that the fields would have been condemned for water core, had they not been sprayed, whereas complete control was obtained in the sprayed portions (J.D. MacLachlan). Brown heart caused a loss of 90% of the crop in a field of Ditmars in Beauce Co., Que.

The disease was very severe, such as usually observed in sand cultures only (R.O. Lachance). Brown heart caused severe damage in P.E.I. in most fields where boron had not been applied this year; it was recorded in Bangholm, Wilhelmsberger, Ditmars, Hazard's Improved, Millpond, Laurentian, etc. (R.R. Hurst)

MAGNESIUM DEFICIENCY was general in some fields and scattered in others, but present in most throughout P.E.I. (R.R. Hurst)

A BACTERIAL DISEASE was observed on the foliage of Swede turnips in 3 fields several miles apart in the Guelph district, Ont., during the latter part of Sept. The following observations were made in one field: The symptoms in no way resemble those of black rot (Xanthomonas campestris). The bacteria apparently avoid the vascular system and no blackening of the veins occurs. First to appear are small yellowish interveinal lesions with watersoaked margins. Then the entire leaf blade and petiole became blanched and the leaf falls. Due to the whitened leaves the diseased areas are very conspicuous in the field. The disease progresses rapidly. It was first noticed at one end of a field, particularly within and surrounding a locus of aphid infestation. Within a week's time, virtually all the leaves had turned yellowish white and dropped with the exception of a few small ones on the crown. These small leaves bore many small lesions. The disease remained confined to one end of the field except for some small isolated patches. Rape that was growing immediately alongside the diseased turnips was not affected. Although the turnip roots showed no symptoms of disease, the almost complete defoliation prevented further growth. A bacterium was isolated from young lesions. (J.D. MacLachlan)

VEGETABLE MARROW

LEAF SPOT (Ascochyta sp.) was slight on 2 seed crops at North Saanich and Duncan, B.C., respectively. Spots many, scattered, up to 5 mm. in diameter, mostly small, irregular, light cream to dirty white with well defined brown margins; pycnidia few, dark; spores oblong 0-1 septate, 7-9 x 3-3.5 microns (W. Jones)

SCLEROTINIA ROT (S. sclerotiorum) destroyed all the plants in a single hill in a planting in Queens Co., P.E.I. (R.R. Hurst)

IV. DISEASES OF FRUIT CROPS

A. POME FRUITS

APPLE

STEM-END ROT (Botrytis cinerea). About 30% of a lot of Delicious apples in a Winnipeg, Man. store were found to be infected, principally at the stem end. (J.E. Machacek)

LEAF SPOT (Coniothyrium pirinum) varied from slight to severe at Morden, Man. (W.L. Gordon)

DIE-BACK (Cytospora ambiens) severely damaged 16 two-year-old crab trees at Katrine, and caused moderate damage to some trees in the Winnipeg district, Man. (J.H. Craigie)

FIRE BLIGHT (Erwinia amylovora) attacked small twigs on most trees of Wealthy in an orchard near Grand Forks; it caused the death of a few twigs of up to 1% of the trees in some orchards in the Chester area, B.C. (G.E. Woolliams). Moderate to severe damage again occurred in the orchard at the Experimental Station, Lethbridge, Alta., and many trees were removed and destroyed (M.W.C.). Blight was severe and general at Morden, Man. (W.L. Gordon). A scattered infection caused killing of twigs in Lincoln Co., Ont. (G.C. Chamberlain). Specimens were received from Allandale, Ont. (L.T. Richardson). Fire blight was prevalent in many orchards throughout Ont. (J.E. Howitt). Fire blight was severe in gardens in the Ottawa district owing to abundant spring rains and the presence of neglected, susceptible crabs and ornamentals. Fire blight was abundant in Quebec, the weather in many districts being comparable to that of the Ottawa district (see The Weather and Its Influence on Plant Diseases) (D.B.O. Savile). Specimens were received from Aylmer, Courcelles, Pointe Claire, Sherrington, St. Stanislas de Kostka, and Ste. Genevieve (H.N. Racicot and L.T. Richardson). A specimen was sent in from Montreal, the owner stating that the tree was very badly diseased (J.E. Jacques). At Abbotsford, Que., fire blight was more common than in recent years, causing slight to moderate damage; the infection was rather uniformly scattered, which suggested that considerable blossom infection had occurred, with bees carrying the bacteria from blossom to blossom and the abundant rains of May and June causing the initial infection of blossoms from hold-over cankers and the later twig infections. It may be noted that Aronia melanocarpa, in a small swamp at Abbotsford well removed from all orchards, was inoculated with E. amylovora in 1934; although no conspicuous cankers were formed, considerable blossom and spur blight occurred, the organism was readily recovered, and the disease persisted through 1936; in 1943 the swamp was re-visited and abundant spur blight was found. Direct infection of apple from Aronia is unlikely, as the latter flowers later, concurrently with mountain ash; but Aronia may serve to distribute the disease over wide areas where other hosts are lacking. (D.B.O. Savile)

SOOTY BLOTCH (Gloeodes pomigena) was seen on Snow and Greening, associated with aphid outbreaks, in various parts of the Niagara Peninsula. (G.C. Chamberlain)

RUST (Gymnosporangium clavipes). Traces were found on McIntosh and Cortland in the Laboratory orchard, St. Catharines, Ont. (G.C. Chamberlain). Only traces were found in N.S.; it was seen on Delicious and Rome Beauty at Kentville. (J.F. Hockey)

FLY SPECK (Leptothyrium Pomi) was common on unsprayed fruit at Kentville, N.S. (J.F. Hockey)

TWIG BLIGHT (Nectria cinnabarina). Up to 6% of fruit spurs were found affected in a few trees of Rome Beauty at Berwick, N.S.; it was also seen on Ben Davis and Gano (J.F. Hockey). A trace was seen on McIntosh in Queens Co., P.E.I. (R.R. Hurst)

ANTHRACNOSE (Neofabraea malicorticis) was common in small, neglected orchards on Vancouver Island, B.C. and caused moderate damage. (W. Jones)

FROG-EYE SPOT (Phyllosticta limitata) caused minor damage to Snow in Northumberland Co., Ont. (G.C. Chamberlain)

BLACK ROT (Physalospora obtusa). A scattered infection was found in the experimental spraying block at Guelph, Ont. (G.C. Chamberlain)

CROWN ROT (Phytophthora Cactorum). No change was seen in the general picture in the Okanagan Valley, B.C. About 2% of the trees are affected to some degree. (R.E. Fitzpatrick)

POWDERY MILDEW (Podosphaera leucotricha). Some cases were seen in the Okanagan Valley, B.C., of severe winter killing of twigs that had been infected in 1942; otherwise powdery mildew caused no commercial damage. (R.E. Fitzpatrick)

BROWN ROT (Sclerotinia fructicola) was found on McIntosh at Guelph, Ont., mostly on mature fruits damaged by scab or insect injury. (G.C. Chamberlain)

SILVER LEAF (Stereum purpureum). Moderate silver leaf and rotting occurred in the University orchard, Edmonton, Alta. (M.W.C.). A moderate infection was seen on some trees at Morden, Man. (J.E. Machacek)

PINK ROT (Trichothecium roseum) was found at St. Catharines, Ont., following heavy scab infection (G.C. Chamberlain). It was severe on McIntosh in Queens Co., P.E.I. (R.R. Hurst)

SCAB (Venturia inaequalis) was fairly general on Vancouver Island and the lower mainland, B.C., but caused less damage than in 1942 (W. Jones). Some orchards in the Grand Forks area showed much scab, probably owing to inadequate spraying; in the northern part of the Okanagan valley scab was not a serious factor and little damage occurred where sprays were applied (G.E. Woolliams). A moderate infection occurred in the University orchard, Edmonton, Alta. (A.W. Henry). Scab was light to heavy on some leaves at Morden, and moderate at Ste. Agathe, Man. (W.L. Gordon)

Scab was prevalent in the Brighton district, Ont., owing to wet weather interfering with spraying; Baxter was very severely scabbed. In the Laboratory orchard, St. Catharines, scab was epidemic; foliage infection ranged from 7 to 80% at the end of July; fruit infection ranged from 16 to 100% at harvest in different spray plots; average in sprayed plots was 39%. Heavy rains of May 17 to 18 and 22 to 23 promoted heavy primary infection (G.C. Chamberlain). A specimen was received from Maxville, Ont. (L.T. Richardson). In many unsprayed orchards in Ont., fruit was 100% scabby. It may be noted, however, that the best growers secured 90 to 98% clean fruit despite the unfavourable weather. (J.E. Howitt)

Scab was unusually severe throughout Quebec, frequent rain making it difficult for growers to apply their sprays and keep new growth covered. The smaller branches in one young, unsprayed orchard were heavily cankered by scab (C. Perrault). By the end of July some growers at Abbotsford, Que., were applying their seventh spray, but despite this there was already some fruit infection, especially on Melba, which seems to be even more susceptible than McIntosh. Eventually some growers applied eight full sprays on late varieties, which meant spraying on almost every fine day, but this intense effort was justified when the fruit was graded. Very little scabby fruit was found from adequately sprayed orchards; but other growers suffered heavy grading losses from this cause. (D.B.O. Savile)

In the St. John River valley, N.B., ascospores were not mature until May 25, during full pink bud development. Initial ascospore discharge occurred on June 3, during full bloom, and primary foliage infection was recorded on June 16. High temperatures from July 9 to 13, inclusive, temporarily checked the fungus. However, excessive rain throughout the season and luxuriant foliage development greatly favoured the occurrence of late scab on the fruit. (S.F. Clarkson)

In N.S., ascospores were mature by the end of April, and were discharging freely in early May, when buds were at the green tip stage. Several periods of heavy ascospore infection occurred before full bloom and before adequate spraying could be done. Continuous conidial infection was possible throughout the summer, owing to exceptional weather conditons. Growers who started to spray early and maintained a good cover produced 90% clean fruit. The N.S. calendar (two 5-15-100 Bordeaux delayed-dormant and pre-pink sprays, followed by three iron-sulphate--lime-sulphure or three flotation sulphur applications) continues to give best results. A sixth spray, of 3-10-100 Bordeaux, in seasons such as 1943 prevents late scab infections. In the 1943 spray experiments Fermate gave better scab control than dry wettable sulphurs. (J.F. Hockey)

MOSAIC (?virus). A well defined mosaic was seen on three trees of Bethel at the Experimental Station, Fredericton, N.B.; a striking leaf-mottling also occurred on one tree of Macoun; and a seedling produced at the Station showed mottling and crinkling and considerable dwarfing. (D.J. MacLeod)

BITTER PIT (non-parasitic) caused slight damage to Northern Spy and Cox's Orange at the Experimental Station, Sidney, B.C. (W. Jones)

DROUGHT SPOT, CORKY CORE and DIE-BACK (boron deficiency). Losses from this cause have been almost eliminated in B.C. See, however, under Pear. (H.R. McLarty)

LEAF SCORCH (cause unknown). As in the past two years, leaf scorch, though present in the Okanagan Valley, B.C., did no serious damage. (R.E. Fitzpatrick)

MAGNESIUM DEFICIENCY severely damaged McIntosh in Queens Co., P.E.I. (G.C. Warren)

MEASLES (cause unknown) caused severe cankering on several young seedlings at Kentville, N.S. (J.F. Hockey)

SPRAY INJURY. No damage was seen or reported in 1943 in the Okanagan Valley, B.C. (R.E. Fitzpatrick). Stem end blackening and fruit scald was attributed to sulphur sprays and high temperature in York Co., Ont. (G.C. Chamberlain). Severe spray injury was seen on McIntosh in Queens Co., P.E.I. (R.R. Hurst)

WATER CORE (non-parasitic) slightly affected King at the Experimental Station, Sidney, B.C. (W. Jones)

WINTER INJURY followed the pruning of Fameuse trees at Whitby, Ont., in November and December. The bark of the trunks split and lifted away from the wood. Similar injury was reported from the Brighton district. (G.C. Chamberlain)

PEAR

FIRE BLIGHT (Erwinia amylovora) was epidemic in a number of young Bartlett orchards in Lincoln and Welland Counties, Ont. In one orchard of 250 trees, 200 were so badly affected that it was thought impractical to try to save the orchard. Heavy pruning and cultivation in 1943 contributed to the severity of the attack. Blight was common in the Niagara Peninsula, after being of minor importance for ten years. (G.C. Chamberlain)

FRUIT ROT (Phytophthora Cactorum) cause a brown rot of the entire fruit in specimens sent in from Kentville, N.S. (J.F. Hockey)

POWDERY MILDEW (Podosphaera leucotricha) was present in the Okanagan Valley, B.C., but was not serious. (R.E. Fitzpatrick)

SCAB (Venturia pyrina). Infection was slight to moderate on Vancouver Island, B.C. (W. Jones). Unusually large lesions were found on D'Anjou fruit near Oliver, Okanagan Valley, B.C., but damage on the whole was negligible (R.E. Fitzpatrick). Scab was conspicuous on Flemish Beauty in the Niagara Peninsula, Ont., infection averaging 15% and the fruit being malformed and with extensive lesions (G.C. Chamberlain). Flemish Beauty was severely scabbed in Queens Co., P.E.I. (R.R. Hurst)

STONY PIT (virus) was observed in Bosc plantings in the Okanagan Valley, B.C.; relatively few fruit on most trees were visibly affected. (R.E. Fitzpatrick)

BLACK END (cause unknown) was present to some extent, especially on Bartlett, in most plantings in the Okanagan Valley, B.C. (R.E. Fitzpatrick)

DIE-BACK (boron deficiency). In an orchard near Westbrook, B.C., where the grower had not made a borax application, severe loss resulted from dying-back of the limbs. (H.R. McLarty)

QUINCE

RUST (Gymnosporangium clavipes) caused a trace of injury in Kings Co., N.S. (G.W. Hope)

B. STONE FRUITS

APRICOT

CORYNEUM SPOT (C. Beijerinckii). Some true Coryneum spot was found in one or two orchards in the Okanagan Valley, B.C. In some other orchards the leaf and fruit spot that occurred seemed to be due to other causes; but this type of spot was less common than in 1942. (H.R. McLarty)

CHERRY

CORYNEUM SPOT (C. Beijerinckii) was severe on fruit and leaves of some trees in the Boswell district, B.C. (H.R. McLarty)

BLACK KNOT (Dibotryon morbosum). Specimens were received from Charlevois Co., Que., and Tracadie, N.B. (L.T. Richardson, H.N. Racicot)

LEAF SPOT (Higginsia hiemalis). Four to ten per cent infection was recorded on Montmorency in the Niagara Peninsula, Ont., resulting in some defoliation. Generally leaf spot was of minor importance. (G.C. Chamberlain)

POWDERY MILDEW (Podosphaera Oxyacanthae) caused stunting of twig growth on Montmorency in Lincoln Co., Ont. (G.C. Chamberlain)

BROWN ROT, BLOSSOM and TWIG BLIGHT (Sclerotinia fructicola and S. laxa). Blossom and twig blight due to S. laxa caused slight damage on Vancouver Island, B.C. (W. Jones). As high as 20% blossom blight due to S. fructicola was seen on Montmorency in Lincoln Co., Ont. Spraying experiments in the Laboratory orchard, St. Catharines, Ont., gave the following results: In the variety Yellow Spanish unsprayed trees showed 28% blossom blight, sulphur-sprayed trees showed 7 to 10%, and copper-sprayed trees showed 11 to 16%; in the variety Schmidt's Bigarreau unsprayed trees showed 20 to 30% fruit rot, and sprayed trees averaged 8% (G.C. Chamberlain). Deitt et al (Phytopath. 33:1212. 1943) have recently demonstrated the occurrence of S. laxa in Wisconsin, but it has not yet been observed in Ont.

MASKED VIROSIS. An apparently healthy tree of Black Eagle, intended for use in virus symptomatology studies at St. Catharines, Ont., was found to contain a virus which caused a streak necrosis and finally a die-back of young peach shoots. An Elkhorn cherry, also selected as healthy, was found to carry a virus suggestive of prune dwarf when indexed on peach. (R.S. Willison)

NECROTIC LEAF SPOT (virus). Counts in three orchards in the Niagara Peninsula revealed 21, 33, and 42% infection. (G.C. Chamberlain)

TATTER LEAF (virus). Twenty-three per cent of the trees in a mixed orchard in Lincoln Co., Ont., were found to be infected. A few infected trees of Tartarian were found in a second orchard. (G.C. Chamberlain)

YELLOWS (virus) was found in 8 orchards inspected in the Niagara Peninsula, infection varying from 25 to 50% (G.C. Chamberlain)

ROOT and CROWN INJURY (wet soil). Severe killing of fruit trees in the Niagara Peninsula resulted from the heavy rains in the fall of 1942 and the excessive moisture of the spring of 1943, especially on heavy or poorly drained soils; the bark at and below ground level was killed. Losses were estimated as follows: peach, 15% (265,000 trees); sweet cherry, 5% (5,400 trees); sour cherry, 4% (8,520 trees); plums, less than 1% (G.C. Chamberlain). An independent survey by Mr. C.B. Kelly yielded similar estimates: peach, 15%; sweet cherry 5 to 6%; sour cherry 4 to 5%. Mr. Kelly also suggests low temperature as a contributory factor; with saturated soil, sub-surface temperatures would certainly tend to be abnormally low.

PEACH

POWDERY MILDEW (Sphaerotheca pannosa) was present but caused little damage in the Okanagan Valley, B.C. (R.E. Fitzpatrick)

BLOSSOM BLIGHT and BROWN ROT (Sclerotinia fructicola). Peaches bloomed late in May, in the Niagara Peninsula, Ont., during showery weather that hindered spraying. Three orchards in Lincoln Co. showed from 8 to 50% blossom blight. Both early and late varieties were affected. Ground treatments considerably reduced the incidence of blossom blight. Brown rot caused considerable damage, but less than the amount threatened by the heavy blossom blight; both drier weather and the increasing use of summer sprays contributed to checking rot. (R.S. Willison)

LEAF CURL (Taphrina deformans) was widely distributed in gardens on Vancouver Island and the lower mainland, B.C. (W. Jones). Leaf curl was virtually absent from commercial plantings in the Okanagan Valley, B.C. (R.E. Fitzpatrick). Rainy spring weather in the Niagara Peninsula, Ont., made it necessary to use every favourable opportunity for spraying, in order to control leaf curl. Some growers reported that Bordeaux mixture failed to control the disease, but late or skimpy spraying was generally to blame. Leaf curl was more prevalent than for several years (R.S. Willison). It was epidemic in some orchards where spraying was late (G.C. Chamberlain). Wet soil made it impossible to spray early in some orchards; the rainy spring showed how few excellent spray jobs are done in the Niagara Peninsula (C.B. Kelly). Leaf curl caused almost complete defoliation in many orchards in the Niagara and Essex districts, Ont. (J.E. Howitt)

BACTERIAL BLIGHT (Xanthomonas pruni) affected 90% of Elberta trees in Lincoln Co., Ont. Trees bordering the lake were most seriously affected, with 75 per cent defoliation by August 28; most other trees showed from 5 to 20 per cent defoliation. (G.C. Chamberlain)

WESTERN X DISEASE (virus). The orchards in the Okanagan Valley, B.C., first mapped in 1940, were again examined. New infections ranged up to 1.8% and averaged 0.5%. In general symptoms were not spectacular, being about as pronounced as in 1942. No new infections occurred in the three orchards that showed the greatest increases in 1942. A larger number of trees that previously showed symptoms failed to do so in 1943, but the foliage of some of these was thin. Some of the latter trees bore basal sprouts with characteristic symptoms. A tree that had shown typical symptoms for three years showed only a fine, bright yellow netting on many leaves. The results of the survey are shown in the following table:-

	Southern Districts#	Northern Districts##
Total trees	3051	257
Diseased trees -- newly infected	15	0
repeat*	70	0
non-repeat**	30	0
total visible	85	0
% visible	2.8	0.0
total with non-repeat	118	0
% with non-repeat	3.9	0.0

\# Osoyoos, Oliver, and Okanagan Falls. ## Summerland and Peachland.
* Symptoms visible in 1943 and earlier. ** Symptoms visible previously but absent in 1943.

A rapid survey of 3,762 trees in orchards north of the known affected areas failed to reveal the disease. (T.B. Lott)

X DISEASE (virus). The second survey of orchards in Niagara Twp., Lincoln Co., Ont., revealed only slight increases of infection. One block increased from 5% to 5.3%, and another from 8.4 to 10%; in orchards where the incidence was low increases of about 0.1 to 0.3% were recorded. (R.S. Willison, G.C. Chamberlain)

BORON DEFICIENCY. The general use of boron throughout the Okanagan Valley, B.C., has eliminated this trouble in stone fruits generally and none was encountered this year. (H.R. McLarty)

ROOT and CROWN INJURY (wet soil). See under Cherry.

SPRAY INJURY. Arsenical sprays caused no damage this year in the Okanagan Valley, B.C. (R.E. Fitzpatrick). Compare P.D.S. 22:85.

WINTER INJURY. Killing of fruit buds of all varieties of peaches occurred in the Niagara Peninsula as a result of the low temperatures of Feb. 14 and 15, 1943. The damage varied from complete in Fonthill and Winona districts (min.-20°F.) to 30% in the central districts (min.-10 to -14°F.) (G.C. Chamberlain). Dr. D.L. Bailey suggests that the wet fall prevented proper hardening of the trees; he also points out that in recent years there has been a tendency to plant peaches on land that is not suited to them.

PLUM

SHOT HOLE (Cercospora circumcissa) was severe on the lower leaves of Opata at Brandon, Man. (W.L. Gordon)

BLACK KNOT (Dibotryon morbosum) affected a few trees in a neglected orchard at Bradner, B.C. (W. Jones). A moderate infection of Stanley prune was seen in Lincoln Co., Ont. This variety seems to be quite susceptible. Knots were commonly found on large branches and occasionally on the trunks of trees (G.C. Chamberlain). A specimen was received from Leskard, Ont. (L.T. Richardson). Black knot was prevalent in districts where plums are not grown commercially in Ont.; in such districts it seems to be increasing annually. (J.E. Howitt)

POWDERY MILDEW (Podosphaera Oxyacanthae) was severe on suckers from the bases of some trees at Mordon, Man.; first record on this host in Man. (J.E. Machacek)

BLOSSOM BLIGHT and BROWN ROT (Sclerotinia fructicola). Blossom blight was not extensive in Lincoln Co., Ont. In the Laboratory orchard, St. Catharines, the following percentages were recorded: German Prune, 14%; Imperial Epineuse, 8%; Imperial Gage, 6%; Lombard, 1%; Yellow Egg, 21%. Brown rot in the same orchard was recorded on the check trees as follows: German Prune, 9%; Imperial Epineuse, 15%; Imperial Gage, 16%; Italian Prune, 20%; Monarch, 50%; Reine Claude, 7%; Yellow Egg, 19%. (G.C. Chamberlain)

Brown rot was injurious in many parts of Ont.; the crop was a total loss where susceptible varieties were unsprayed (J.E. Howitt). Specimens were received from Tecumseh (L.T. Richardson). Very heavy losses from brown rot occurred in Queens Co., P.E.I., especially in late September. (R.R. Hurst)

BLOSSOM and TWIG BLIGHT (Sclerotinia laxa). A light infection occurred at the Experimental Station, Sidney, B.C.; it was less prevalent than in 1942. (W. Jones)

PLUM POCKET (Taphrina communis). Specimens were received from Billings Bridge, Ont., and Breakeyville, Que. (H.N. Racicot). A very heavy infection occurred in one orchard in P.E.I., and reports were received from elsewhere (R.R. Hurst). T. Pruni (Fckl.) Tul. was found on a few plum trees in an orchard at Courtenay, B.C. (W. Jones). Dr. W.W. Ray, after examining this specimen, writes: "The asci of specimen 14077 are indeed rather long, and their length, it would seem to me, would exclude the fungus from my concept of Taphrina communis.

Although I have never made an extensive study of T. pruni, the asci of this fungus are reported to be as much as 60 microns long, and I found the asci in your specimen as long as that. I strongly suspect that your fungus is T. pruni." It may be noted that this is the only Canadian collection of T. Pruni in the Herbarium. All specimens so labelled that have been critically examined, have proved to be T. communis. Moreover, most, if not all of the early records of T. Pruni in the P.D.S. are likewise referable to T. communis. (I.L. Conners)

RUST (Tranzschelia Pruni-spinosae) was common on plum foliage in the fall at the Experimental Station, Sidney, B.C., but caused negligible damage. (W. Jones)

BACTERIAL BLIGHT (Xanthomonas pruni) caused scattered fruit spotting in Lincoln Co., Ont. (G.C. Chamberlain)

CHLOROSIS and DWARFING (cause unknown). An orchard of Reine Claude in Lincoln Co., Ont., has a number of trees that have been growing poorly for several years, are noticeably stunted, and show short current year's growth; foliage was yellowish and inclined to be papery. Although fertility was somewhat low, soil tests disclosed no definite deficiencies. Some have been indexed to check for the presence of a virus. (R.S. Willison)

DEFOLIATION and FRUIT DROP (cause unknown). Trees in several Italian Prune orchards in Lincoln Co., Ont., showed considerable defoliation and fruit drop in August. Many of the remaining leaves were yellowish, yellow between veins, mottled, or with marginal scorching. There was a tendency toward leaf-rolling. (R.S. Willison)

GUM SPOT (cause unknown) was unusually prevalent in the northern Okanagan Valley, B.C. (R.E. Fitzpatrick)

ROOT and CROWN INJURY (wet soil). See under Cherry.

SPRAY INJURY. Much of the leaf spotting on prunes that has occurred during the last three years in the Okanagan Valley, B.C., is now thought to be due to soap and arsenic sprays. Injury was not generally severe this year, but in one orchard complete defoliation followed the application of nicotine and soap. (R.E. Fitzpatrick).

SAND CHERRY

SHOT HOLE (Cercospora circumcissa) was heavy on Champa at Brandon, Man. (W.L. Gordon).

C. RIBES FRUITS

CURRANT

WHITE PINE BLISTER RUST (Cronartium ribicola) was extremely heavy on black currants in the Ottawa district, Ont., most bushes being almost completely defoliated. Red currants were moderately to heavily rusted (D.B.O. Savile). A heavily rusted specimen was received from St. Lambert, Que.

(H.N. Racicot). Traces of rust were seen in a number of gardens in P.E.I., and a heavy infection in one (R.R. Hurst). A.W.S. Hunter and M.B. Davis (Proc. Amer. Soc. Hort. Sci. 42:467. 1943) have recently made a preliminary report on the progress made at the Division of Horticulture, Ottawa, in the breeding of black currants resistant to blister rust. A number of promising seedlings were obtained and one of these, a Kerry x R. ussuriense hybrid is being increased for distribution under the name Ottawa 381; it is hoped that it will be possible to supply nurseries with limited material by the fall of 1944, but it will be several years before it is available to the public.

ANTHRACNOSE (Drepanopeziza Ribis) caused moderate damage in the Courtenay district, B.C. (W. Jones). It was severe at Morden, Man., on red and white currants. (W.L. Gordon)

SEPTORIA LEAF SPOT (Mycosphaerella Grossulariae) was moderate at Gimli, and slight to severe at Morden, Man. (W. L. Gordon). A trace was seen in P.E.I. (R.R. Hurst)

LEAF SPOT (Phyllosticta Grossulariae Sacc.) caused slight damage to white currants in a garden in the Courtenay district, B.C. (W. Jones). First Canadian record of this fungus.

CLUSTER CUP RUST (Puccinia Pringshoimiana) slightly infected one red currant bush at Winnipeg, Man. (J.E. Machacek)

POWDERY MILDEW (Sphaerotheca mors-uvae). A severe infection occurred at Edgerton, Alta. (L.E. Tyner). A moderate, general infection was found at Morden, Man. (W.L. Gordon). A specimen was received from Bowsman River, Man. (L.T. Richardson)

GOOSEBERRY

ANTHRACNOSE (Drepanopeziza Ribis) caused considerable leaf spotting and defoliation at Saulnierville, N.S. (J.F. Hockey)

SEPTORIA LEAF SPOT (Mycosphaerella Grossulariae). A trace was found on all varieties at Lacombe, Alta. (M.W. Cormack). Infection was moderate at Morden, Man.; a slight to moderate infection also occurred on wild gooseberry under cultivation. (W.L. Gordon)

CLUSTER CUP RUST (Puccinia Pringshoimiana) moderately infected a small area of a commercial planting in Digby Co., N.S. (J.F. Hockey)

POWDERY MILDEW (Sphaerotheca mors-uvae) was heavy on many bushes at Morden, Man. (W.L. Gordon). It caused moderate leaf scorch and defoliation and serious marring of fruit in Lincoln Co., Ont. (G.C. Chamberlain). Twenty-five per cent of the fruit was spoiled and many twigs were stunted in a garden at Abbotsford, Que. (D.B.O. Savile). Mildew was very severe on leaves, fruit and twigs of unsprayed bushes in Annapolis Co., N.S.; good control was effected with lime-sulphur sprays (J.F. Hockey). A mild outbreak occurred in a garden at Charlottetown, P.E.I. (R.R. Hurst)

D. RUBUS FRUITS

BLACKBERRY

ANTHRACNOSE (Elsinoe veneta). A light, general infection occurred on leaves and petioles at Morden, Man. (W.L. Gordon)

RASPBERRY

CROWN GALL (Agrobacterium tumefaciens). A Latham planting in Peel Co., Ont., showed 20% crown gall, but the canes appeared to have made good growth in spite of a general infection of roots and crowns (G.C. Chamberlain). In P.E.I. one Viking planting showed 60% infection, and the disease was reported from four other locations. (R.R. Hurst)

LEAF SPOT (Ascochyta sp.). A trace of spotting on a leaf at Morden, Man., yielded an Ascochyta with spores 7.5-12 x 3 microns. (W.L. Gordon)

CANE BLIGHT (Botrytis cinerea) caused considerable damage in Ottawa seedlings at the Agricultural College Farm, Truro, N.S. (J.F. Hockey)

SPUR BLIGHT (Didymella applanata). All varieties at Lacombe, Alta., were slightly infected (M.W. Cormack). A light infection was seen on some canes at Morden, Man. (W.L. Gordon). A 15% infection in a Latham plantation in Middlesex Co., Ont. caused extensive cane lesions and bud killing (G.C. Chamberlain). A specimen was received from Bedford, Que. (L.T. Richardson). Spur blight severely damaged Viking in several localities in P.E.I. (R.R. Hurst)

ANTHRACNOSE (Elsinoe veneta). A moderate, patchy infection occurred on Rideau, at Morden, Man.; a heavy infection also occurred on some black raspberries (W.L. Gordon). Anthracnose was prevalent on Taylor, which is very susceptible, in Middlesex Co., Ont., and caused stunting. (G.C. Chamberlain)

KILLING OF CANES (Fusarium avenaceum). Dead canes of Indian Summer received from Eburne, B.C., showed orange spore masses in cracks. (L.T. Richardson; det. W.L. Gordon)

SEPTORIA LEAF SPOT (Mycosphaerella Rubi). A trace occurred on wild raspberry under cultivation at Morden, Man.; a moderate infection occurred on Rideau, and a light infection on O-275 (W.L. Gordon). The disease was general on Latham in Middlesex Co., Ont., and caused slight defoliation; close planting and woods favoured development (G.C. Chamberlain). A specimen was received from Spanish, Ont. (H.N. Racicot)

YELLOW RUST (Phragmidium Rubi-idaei). Aecia were seen in May on leaves of Cuthbert in coastal B.C. This rust is usually present on susceptible varieties such as Cuthbert and Viking; but growers are increasing the acreage of Washington, which has, so far, proved resistant (W. Jones). Yellow rust was general on Cuthbert in the Brantford district, Ont., (DAOM 14099) causing some defoliation late in the season. (G.C. Chamberlain)

LATE YELLOW RUST (Pucciniastrum americanum). A light, general infection occurred on wild raspberries under cultivation at Morden, Man.; slight amounts also occurred on O-275 and Viking, but less than in 1942 (W.L. Gordon). Severely rusted fruits were received from Clarence, Ont., with no information as to variety or extent of infection (H.N. Racicot). Aecia were developed on Picea canadensis on June 16 at Springhill, York Co., N.B., near a large plantation of Viking and Newman. The owner claimed that 3,000 quarts, out of 9,000 quarts of Viking picked, were unsaleable because of rust. The cost of harvesting is seriously increased by the time required in selecting healthy fruit. A grower at Dorchester, N.B., claimed to have lost 10 crates out of 35 from rust (S.F. Clarkson). Several cases of late rust were reported in P.E.I., but there was no serious damage. (R.R. Hurst)

POWDERY MILDEW (Sphaerotheca Humuli). Specimens were received from Frenchmans Butte, Sask. (H.W. Mead). A 75% infection occurred in a nursery planting of Latham in Hastings Co., Ont., causing severe stunting. About 35% infection occurred in a nursery planting of Latham in Welland Co., causing some stunting (G.C. Chamberlain). Heavily mildewed cane tips were received from Osgoode, Ont. (H.N. Racicot)

WILT (Verticillium alboatrum). A severe infestation spreading inward from one side of a small plantation at Digby, N.S., killed 10 to 12% of the canes. (J.F. Hockey)

DECLINE (virus) is fairly general in Cuthbert plantings on Vancouver Island and the lower mainland, B.C. The symptoms are as described by S.M. Zeller and A.J. Braun (Phytopath. 33:156-161. 1943). The main symptom is a gradual deterioration of cane and root growth over a period of years. (W. Jones)

LEAF CURL (virus). One per cent of Cuthbert in a plantation in Welland Co., Ont., was infected. (G.C. Chamberlain)

MOSAIC (virus). In the variety trial plots at the Experimental Farm, Agassiz, B.C., 50% of the plants of Ottawa O-275 were infected, while all plants of the remaining varieties, namely, O-201, O-263, O-271, O-277, Gatineau, Madawaska, Rideau, Trent, and Washington, were free from this disease (W. Jones). Some plants at Winnipeg, Man., were severely affected (J.E. Machacek). One per cent of Cuthbert and Ottawa in a nursery in Wentworth Co., Ont., were infected. It was found on Latham in a second nursery. Mosaic was also found on Ottawa at Goderich and Stayner. A Cuthbert planting in Welland Co. showed 15% infection (G.C. Chamberlain). A trace of mosaic was found in a plantation in Sunbury Co., N.B. It was common on wild red raspberries in Sunbury, York and Carleton Counties (D.J. MacLeod). Traces were found on Viking and Cuthbert in Queens Co., P.E.I. (R.R. Hurst)

CHLOROSIS (excess lime) was seen in some plants at Winnipeg, Man. (J.E. Machacek)

E. OTHER FRUITS

BLUEBERRY

CANKER (Godronia Cassandrae). Specimens of New Giant from Eburné, B.C., with the Fusicoccum putrefaciens stage in good fruit, were received with the statement that the plants were dying every day (H.N. Racicot, L.T. Richardson). A specimen was also received from B.C. through J.W. Eastham, but the exact origin is not known (I.L. Conners). Previously reported from Que.

FIG

TWIG BLIGHT (?Botrytis cinerea) was prevalent on a few trees at the Experimental Station, Sidney, B.C. Botrytis sp. of the cinerea type was isolated from diseased tissue. (W. Jones)

GRAPE

DEAD ARM (Fusicoccum viticola) was seen on Concord in several vineyards in Lincoln Co., Ont., infection averaging 2%; seemingly more prevalent than for several years. (G.C. Chamberlain)

BLACK ROT (Guignardia Bidwellii) caused considerable losses on Niagara and Concord in poorly sprayed vineyards in Lincoln Co., Ont. (G.C. Chamberlain). Similar observations were made by Prof. J.E. Howitt.

DOWNY MILDEW (Plasmopara viticola) was moderately severe on Agawam in Lincoln Co., Ont., causing some shelling of fruit and leaf scorch; mildew was heavy on unsprayed grapes in the Ottawa district, Ont. It was abundant on wild Vitis vulpina by July 1. See also under Vitis in Diseases of Ornamental Plants. No mildew could be found on the grapes at the Central Experimental Farm, where aeration was good and spraying was adequate. (D.B.O. Savile)

PINEAPPLE

FRUIT ROT (?Penicillium sp.). All the fruit in a store at Winnipeg, Man., were soft and oozing. Penicillium was fruiting in cracks and between segments. (J.E. Machacek)

STRAWBERRY

GREY MOULD (Botrytis cinerea). Losses up to 20% were seen in plantings in the Berwick district, N.S. (J.F. Hockey). Late in the picking season many plantations in P.E.I. showed a little of this trouble. (R.R. Hurst)

LEAF SPOT (Mycosphaerella Fragariae). A moderate infection was found at the Experimental Station, Lacombe, Alta. (W.C. Broadfoot). At Morden, Man., a moderate infection occurred on Louise and Meighen; less on other varieties, and much less generally than in 1942 (W.L. Gordon). Leaf spot was moderately heavy in Lincoln Co., Ont. (G.C. Chamberlain). Traces were seen on Senator Dunlap in Queens Co., P.E.I. (R.R. Hurst)

POWDERY MILDEW (Sphaerotheca Humuli). A light infection occurred on Senator Dunlap in Queens Co., P.E.I. (R.R. Hurst)

WITCHES BROOM (virus). A few infected plants were found in a patch of Premier at Berwick, N.S. (J.F. Hockey)

JUNE YELLOWS (?virus). A planting of Premier in Lincoln Co., Ont., showed 2% infection; newly set out plants were markedly retarded in growth (G.C. Chamberlain). A trace was seen on Dick in P.E.I. (R.R. Hurst)

ROOT ROT (cause unknown) was common in commercial plantings on Vancouver Island and the lower mainland, B.C., and caused considerable damage. (W. Jones)

V. DISEASES OF TREES AND SHRUBS

ACER - Maple

Leaf Spot (Cylindrosporium pennsylvanicum E. & E. (Septoria acerina Peck) was found on A. pennsylvanicum at Beauceville (Fr. Anselme) and Abbotsford, Que.; specimens on A. pennsylvanicum and A. spicatum, collected in 1938 at Mount Orford, Que., were received from Pere Leopold.

Leaf Spot (Phleospora Aceris (Lib.) Sacc.) on A. rubrum was found at Mt. Rolland and Beauceville, Que. (Fr. Anselme; det. I.L. Connors). Not previously reported in the Survey.

Leaf Spot (Phyllosticta spp.). A study was made of the leaf spots occurring on maples in Canada, as a result of some points that arose from a study of recent collections. P. minima (P. acericola C. & E.) was collected on A. rubrum at Abbotsford, Que., A. saccharinum at Westboro, Ont., and A. tataricum at Ottawa. These specimens, with spores 6.5-9.5 x 5.5-7 microns, agree exactly with E. & E. F. Columb. 660, Barth. F. Columb. 3830 and 4246, and Roum. F. Gall. 3485; but not with E. & E. F. Columb. 140, which is a Gloeosporium (perhaps G. saccharinum) on A. saccharum; they also agree with the description given in Saccardo (Syll. 3:115), but are quite different from the description of Seaver (N. Am. Flora 6:50), who gives the spore size as 2 x 6 microns, occasionally 10 microns long. We also have specimens of the same fungus on A. saccharinum, A. spicatum and A. platanoides. All our specimens on A. saccharum received under this name are a Gloeosporium indistinguishable from E. & E. F. Columb. 140. It is to be noted that Phyllosticta minima (B. & C.) Underw. & Earle (Ala. Agr. Sta. Bull. 80:168, Apr. 1897) antedates Ellis & Everhart's publication of this combination (North American Phyllostictas, 1900). P. minutissima was found in early September at Rupert, Que., causing moderate damage to A. saccharum and serious damage to A. spicatum, small trees of the latter species being almost completely defoliated. Represented in the herbarium from B.C. and Alta. on A. glabrum. The microconidial stage of Cylindrosporium consociatum Dearn. has been referred to P. minutissima, but there is no trace of Cylindrosporium on these specimens. (D.B.O. Savile, I.L. Conners)

Leaf Spot (Piggotia Negundinis) was heavy locally, but generally slight in a hedge of A. Negundo at Morden, Man. (W.L. Gordon)

Leaf Spot (Septoria Negundinis) was light but general in a hedge of A. Negundo at Morden, Man. (W.L. Gordon)

AESCULUS - Horsechestnut

Leaf Spot (Guignardia Aesculi (Phyllosticta Paviae) on Ae. Hippocastanum was received from Angus, Ont. (R. Macrae). It was abundant on many trees at Charlottetown, P.E.I. (R.R. Hurst)

Leaf Spot (Septoria ?Aesculi (Lib.) West.) was severe on some leaves of Ae. Hippocastanum at Morden, Man. Coniothyrium sp. was also present in the lesions (W.L. Gordon). S. Hippocastani Berk. & Br. and S. aesculina Thum. do not seem to be distinct. Represented in the herbarium by one collection from Owen Sound, Ont. (I.L. Conners, D.B.O. Savile)

ALNUS - Alder

Leaf Spot (Septoria Alni Sacc.) was heavy on one small tree of A. nitida and light on another in the Arboretum, Ottawa. Spores are somewhat narrower than in Saccardo's description, but the specimen fits this species much more closely than any other. Roumegere's F. Gall. 7274 is entirely distinct; it is probably Gloeosporium cylindrospermum. (D.B.O. Savile)

AMELANCHIER

Leaf Spot (Entomosporium maculatum) was general and caused yellowing in a hedge at Morden, Man. (W.L. Gordon)

Fire Blight (Erwinia amylovora). A light infection occurred on A. alnifolia at Morden, Man. (W.L. Gordon)

Rust (Gymnosporangium spp.). A light infection of G. clavipes occurred at Falmouth, N.S. (G.W. Hope). G. corniculans was very heavy on a bush of A. alnifolia at Brandon, Man., planted 20 feet from Juniperus virginiana bearing galls. (W.L. Gordon)

Branch Cankor (Valsa sp.) caused slight damage at Edmonton, Alta. Organism probably close to V. ambiens. (W.C. Broadfoot, I.L. Connors)

BETULA - Birch

Leaf Spot (Septoria Betulae(Lib.)Wost.) was general and heavy in a hedge of B. pumila at Morden, Man. (W.L. Gordon). It was heavy on young growth of B. papyrifera at Rupert, Que. (D.B.O. Savile, I.L. Conners). A specimen on B. sp. was received from Mt. Rolland, Que. (Fr. Anselme; det. I.L. Conners)

Die-Back (cause unknown). Large stands of B. lutea and B. papyrifera in N.B. are succumbing to a progressive die-back of the crowns of the trees. Affected trees have sparse, chlorotic foliage, many dead buds, and greatly reduced terminal growth. Although commonest in overmature trees, this condition is also seen in young ones. Affected trees often, but not always, are infested by the bronze birch borer. Sections of affected twigs and branches often show abundant mycelium in and between the vessels and wood fibers. No fruiting structures have been found constantly associated with the disease. (J.L. Howatt)

CORNUS - Dogwood

Leaf Spot (Septoria cornicola). Infection was moderate in a hedge of C. alba at Morden, Man. (W.L. Gordon)

CORYLUS - Filbert

Leaf Spot (Gloeosporium Coryli). A heavy infection caused moderate damage to C. cornuta at Uplands, Ont. Previously reported in P.D.S. from N.S. and recorded by Bisby et al. from Man. Specimens in herbarium from Ont. and Que. Examination of material and of the literature fails to show significant or constant differences between G. Coryli and Labrella Coryli reported (P.D.S. 22:92) from B.C.; nor does there seem to be good reason for the exclusion of L. Coryli from Gloeosporium. In addition to many round lesions in the body of the leaf blade, in which acervuli were mainly epiphyllous, there was a prominent marginal scorching, probably due to hydathode infection, and the acervuli were almost equally distributed on both leaf surfaces; the same condition was noted in the B.C. specimen. (D.B.O. Savile, I.L. Conners)

Leaf Spot (Gnomoniella Coryli) was moderately heavy on C. cornuta at Canaan, N.S. (R.M. Lewis)

Leaf Spot (Septoria corylina) was moderate to severe in a hedge of C. americana at Morden, Man. (W.L. Gordon)

COTONEASTER

Die-Back (?Erwinia amylovora). Fire blight was suspected of causing the death of some branches at Morden, Man., but the pathogen could not be isolated; Polyporus tulipiferae was found on the bases of affected branches. (W.L. Gordon)

CRATAEGUS - Hawthorn

Scald (Fabraea maculata) was general and caused some defoliation in parks and gardens at Brentwood, B.C. (W. Jones)

Rust (Gymnosporangium spp.). A slight infection of G. Betheli occurred on leaves and fruit of C. rotundifolia in a hedge 75 yards from rusted Juniperus scopulorum at Morden, Man. A trace occurred in a hedge of C. succulenta the same distance from the Juniperus, but a bush 15 feet from it had every leaf killed. Both are new host records for Man. (W.L. Gordon). G. clavipes infected about 10% of the fruits and a scattering of twigs and peduncles of Crataegus sp. at Ottawa. (D.B.O. Savile)

Powdery Mildew (Podosphaera Oxyacanthae) was generally light, but locally heavy, in a hedge of C. succulenta at Morden, Man. First record in Man. on this host (W.L. Gordon). Mildew was moderately heavy on C. sp. in Queens Co., P.E.I. (R.R. Hurst)

ELAEAGNUS

Leaf Spot (Septoria Elaeagni). A trace occurred at Morden, Man., much less than in 1942 (W.L. Gordon). Inadvertently reported as on E. commutata in P.D.S. 22: p. 100.

FRAXINUS - Ash

Leaf Spot (Piggotia Fraxini) was moderate to severe in a hedge of F. pennsylvanica var. lanceolata at Morden, Man. (W.L. Gordon)

HIPPOPHAE - Sea-Buckthorn

Rust (Puccinia coronata). Pycnia, presumably of this species, were seen on this shrub at Winnipeg, Man.; it was growing close to plots of infected Calamagrostis inexpansa. (A.M. Brown)

JUGLANS

Leaf Spot (Marssonina Juglandis) on J. cinerea was received from Mt. Rolland, Que. (Fr. Anselme). It had caused considerable defoliation of all butternuts at Abbotsford, Que., by July 24. Most trees show much dead wood, perhaps partly due to this disease, which has been seen there for many years. (D.B.O. Savile)

Bacterial Blight (Xanthomonas Juglandis) was general and caused considerable damage to leaves and nuts of J. regia at the Experimental Station, Sidney, B.C. (W. Jones)

JUNIPERUS

Rust (Gymnosporangium spp.) Galls of G. Betheli were common on a hedge of J. scopulorum at Morden, Man.; new host record for Man. Galls of G. corniculans were found on J. virginiana at Brandon, Man.; new host record for Man. (W.L. Gordon)

Twig Blight (Phoma sp.) caused moderate damage to J. scopulorum at Morden, Man.; new host record for Man. (W.L. Gordon)

MALUS

Leaf Spot (Coniothyrium pirinum) lightly infected a hedge of M. baccata at Morden, Man. (W.L. Gordon)

Fire Blight (Erwinia amylovora) affected a few branches of M. baccata and M. transitoria at Morden, Man.; the latter is a new host record for Man. (W.L. Gordon)

OSTRYA - Hop-Hornbeam

Leaf Spot (Cylindrosporium Dearnessii) lightly infected a large tree at Brandon, Man. (W.L. Gordon). Previously reported from Ont. only.

PICEA - Spruce

Rust (Chrysomyxa ledicola) was common in a hedge of P. glauca at Winnipeg, Man. (A.M. Brown). A light infection was seen in King's Co., P.E.I. (R.R. Hurst)

Witches' Broom (Peridermium coloradense) caused slight damage to P. rubra at Coldbrook, N.S. (R.M. Lewis)

PINUS - Pine

Needle Blight. Many needles of P. mugo at Morden, Man., turned yellow. Isolations yielded Pullularia pullulans and Phoma glomerata. (W.L. Gordon)

Rust (Coleosporium Solidaginia). A few affected needles of P. Banksiana were received from H.A. Richmond, Sandilands Forest Reserve, Man. The rust was found to agree with Peridermium montanum Arth. & Kern on Pinus contorta, rather than with P. acicola (acicolum) Underw. & Earle described on P. rigida but common in Ont. & Que. on P. resinosa. The Peridermium on jack pine is represented in the herbarium from Sask., Man., Ont. and Que. Examination of the uredinia on Solidago indicates that spores in collections from the Rocky Mts. region tend to be finely marked, while some of the eastern material is very coarse; but intermediate markings are common in collections across Canada. While it is easy to distinguish P. delicatulum on Pinus rigida from the other peridermia mentioned, the uredinia on Euthamia (a segregate of Solidago) differ little. Euthamia growing in the goldenrod plots in the Arboretum, Ottawa, remained free from C. Solidaginis, while most of the true goldenrods were heavily rusted. See under Goldenrod. A shoot of P. resinosa moderately infected with C. Solidaginis was received from Shawville, Que. (I.L. Conners)

Blister Rust (Cronartium ribicola). Specimens of infected P. strobus were received from Yarmouth Co., N.S., where some damage was reported. (J.F. Hockey)

Needle Cast (Hypodermella ampla (Davis) Dearn.) was received from H.A. Richmond, Sandilands Forest Reserve, Man.; he reports that it is prevalent in the Reserve, many trees having lost all needles 2 years or more of age. G.D. Darker (Contrib. Arnold Arb. 1.1932) states that it is destructive. (I.L. Conners)

PLATANUS - Plane Tree

Anthracnose (Gnomonia veneta) was general on trees in the park at Sidney, B.C., causing slight damage to twigs and leaves. (W. Jones)

POPULUS - Poplar

Limb Galls (Cucurbitaria staphula). A moderate infection was found on several trees of P. tacamahaca in a coulee near Indian Head, Sask. (H.W. Mead)

Leaf Blight (Linospora tetraspora). Heavy infection of P. tacamahaca occurred in many sections of central Alta. (M.W. Cormack). The same species was heavily infected, with moderate damage, at Uplands, Ont. (I.L. Conners)

Rust (Melampsora spp.) M. Abieti-canadensis severely damaged P. grandidentata in Prince Co., P.E.I. (R.R. Hurst). M. medusae was severe on P. canadensis var. Northwest, at Morden, Man. (W.L. Gordon). The following spp. were rusted in varying degrees at Montreal Botanical Garden: P. Andrewsii, P. balsamifera, P. candicans, P. generosa, P. Kanjilaliana, P. laurifolia, P. Petrowskyana, P. robusta, P. Simonii, P. szechuanica, P. trichocarpa, and P. sp. (J.E. Jacques)

Leaf Spot (Phyllosticta brunnea). A trace occurred on P. sp. at Morden, Man. (W.L. Gordon)

Leaf Spot (Septoria spp.). A moderate infection of S. musiva occurred at Morden, Man., on "Russian Poplar" (W.L. Gordon). S. populicola caused considerable damage to P. sp. at Comox, B.C. (W.Jones, I.L. Conners)

PRUNUS

Shot Hole (Cylindrosporium spp.). P. Cerasus was heavily and P. pennsylvanica moderately infected by C. hiemale in hedges at Morden, Man. The lower leaves of a hedge of P. nana at Morden, were heavily infected by C. prunophorae. (W.L. Gordon)

Powdery Mildew (Podosphaera oxyacanthae) was severe on a hedge of P. Cerasus at Morden, Man. (W.L. Gordon)

Blossom & Twig Blight (Sclerotinia spp.). S. fructicola caused cankers on P. glandulosa at Liverpool, N.S. (J.F. Hockey). S. laxa caused considerable damage to the blossoms of a few shrubs of P. triloba at Brentwood, B.C. (W. Jones)

Leaf Curl (Taphrina insititiae). The leaves of one branch of a bush of P. pennsylvanica planted for ornament at Ponemah, Man., were severely infected (W.L. Gordon). In the herbarium, on wild P. pennsylvanica from Man., Ont., Que., and N.S.

PYRUS

Leaf Spot (Coniothyrium pirinum). A hedge of P. pashia (Kashmir pear) at Morden, Man., was moderately infected. First record on this host. (W.L. Gordon)

QUERCUS - Oak

Leaf Spot (Marssonina Martini) was found on Q. macrocarpa at Ottawa, Ont. (H.T. Gussow; det. I.L. Conners)

Powdery Mildew (Microsphaera Alni) occurred sparingly in a hedge of Q. macrocarpa at Morden, Man. (W.L. Gordon)

Leaf Spot (Taphrina caerulescens). A scattered infection was found on Q. borealis on Mt. Yamaska, near Abbotsford, Que. (D.B.O. Savile)

RHAMNUS - Buckthorn

Rust (Puccinia coronata) was common on bushes of R. alnifolia and R. cathartica on June 18 at Winnipeg, Man. (A.M. Brown). R. alnifolia was slightly to severely damaged in Victoria and Carleton Counties, N.B.; material sent to Winnipeg was identified by B. Peturson as P. coronata var. Calamagrostidis. R. athartica was severely rusted in York Co., where aeciospores were being liberated by July 2. Rust caused slight to moderate damage on R. Frangula in York Co..; no infection could be obtained on oats at Fredericton, or at Winnipeg by B. Peturson, or on various grasses commonly attacked by P. coronata at Fredericton; these results are in agreement with inoculations and field observations made during that last three years (S.F. Clarkson). Rust was heavy in a hedge of R. cathartica at Summerside, P.E.I. (R.R. Hurst)

SALIX - Willow

Anthracnose (Gloeosporium Salicis) severely affected the lower leaves of S. alba var. vitellina in a hedge at Morden, Man.; found on this host in 1927, but not reported (W.L. Gordon). Also known from P.D.S. or Herbarium from Alta., Ont., Que., and N.S. on S. spp.

Blight or Canker (Marssonina Kriegeriana) was found to be widespread in the Vancouver, B.C., district on S. babylonica. (A.F. Barss and H.T. Gussow; det. I.L. Conners)

Rust (Melampsora Abieti-capraearum). A slight infection occurred on S. purpurea var. gracilis in a hedge at Morden, Man.; first record on this host in Man. (W.L. Gordon). It was heavy on a tree of S. rubra in the Arboretum, Ottawa, although none could be found on adjacent Salix spp. (D.B.O. Savile; det. I.L. Conners).

Tar Spot (Rhytisma salicinum) was slight on Salix sp. at Morden, Man. (W.L. Gordon)

SORBUS - Mountain Ash

Leaf Spot (Entomosporium maculatum) was moderately heavy on S. americana at Brandon, Man., causing considerable yellowing. (W. L. Gordon)

Rust (Gymnosporangium aurantiacum) was heavy on the leaves of young trees planted at Clearwater Bay, Ont. (W.L. Gordon)

ULMUS - Elm

Black Spot (Gnomonia ulmea) was severe in a hedge and moderate elsewhere on U. americana at Morden, Man. A slight infection occurred in a hedge of U. pumila at the University of Manitoba, Winnipeg (W.L. Gordon). Black spot is so prevalent on U. americana in the Ottawa district that it generally escapes comment; it did not appear to be unusually severe in 1943 despite the wet season (D.B.O. Savile). Five trees out of several hundred in a hedge of U. pumila at Montreal Botanical Garden were attacked. (J.E. Jacques)

Leaf Spot (Phyllosticta ulmicola Sacc.) moderately affected some leaves in a hedge of U. americana at Morden, Man.; mature spores 4.7-7.5 x 2.7-3.3 microns, olivaceous, ends rounded, immature spores hyaline, narrower, pointed at ends (W.L. Gordon). Not previously reported in P.D.S. Our only Canadian specimen is

a collection by J. Dearness, July, 1890, at London, Ont., on U. fulva, and assigned by him and Ellis to P. ulmicola; the spores run 4-5.7 x 2.4-3.3 microns, against 6 x 3 microns given by Saccardo, but agree in varying from hyaline to olivaceious. (D.B.O. Savile)

Coral Spot (Nectria cinnabarina) made so much progress in hedges of U. pumila at the Montreal Botanical Garden and elsewhere in Montreal, Que., that annual pruning and frequent inspections are clearly inadequate to control the disease. Since no other control measures seem economically possible, the growing of this tree in hedges will have to be discontinued. (J.E. Jacques)

VIBURNUM

Leaf Spot (Cercospora varia) was moderately heavy on and caused slight damage to two shrubs of Viburnum Opulus nanum in the Arboretum, Ottawa, Ont. No infections could be found on other species near by, and it is thought that the low, dense habit of this plant encouraged spread of the disease by hindering aeration. (D.B.O. Savile)

Rust (Coleosporium Viburni) caused some defoliation of V. cassinoides in Cumberland Co., N.S. (J.F. Hockey). A light to moderate infection of V. Lentago occurred in the Ottawa district. (I.L. Conners, D.B.O. Savile)

Powdery Mildew (Microsphaera Alni) was light in a hedge of V. dentatum at Morden, Man.; first record on this host in Man. (W.L. Gordon)

Leaf Spot (Phyllosticta ?punctata Ell. & Dearn.). A moderate infection occurred in a hedge of V. pubescens at Morden, Man.; spores 5-10 x 3 microns (W.L. Gordon). P. Lentaginis (spores 4-5 x 2.5-3 microns, brownish) is reported from Man. (Bisby et al.) on V. pubescens. Two early collections from near Ottawa on V. acerifolium are labelled P. Lentaginis; one is sterile but the other is fruiting sparsely and the spores agree with the description. We have no record of P. punctata from anywhere but the type location, London, Ont.; of four specimens, all collected by J. Dearness on V. Opulus, two in the general collection (Aug. 1892 and Sept. 1898) appear to be sterile; of the other two collections, one, E. & E. Fungi Columb. 1245 (Sept. 1896), bears few pycnidia with spores none or 4.3-6.7 x 1.7-3 microns, apparently immature; the other, E. & E. N.A. Fungi 2832 (Aug. 15, 1892), yielded a large-spored Hendersonia (spores 12-27.5 x 4.5-6.5 microns, 5 to 7 septa, chestnut brown), which does not agree with H. Viburni, H. foliorum var. Viburnum, or H. Tini. (D.B.O. Savile)

Downy Mildew (Plasmopara Viburni Pk.) was abundant on V. spp. at Ottawa, Ont. A survey was made of the main planting in the Aboretum, after carefully checking the identity of every plant. As all species are growing close together, the following table may give some idea of relative susceptibility as the disease occurred locally in 1943:

Species	No. of Plants	Rate of Infection
V. cassinoides	1	Nil
dentatum	3	Nil
Lantana	2	Slight to mod.
Lantana rugosum	4	Slight to mod.
Lentago	6	Nil

Species	No. of Plants	Rate of Infection
nudum	1	Nil
Opulus	3	Slight to mod.
Opulus nanum	2	Mod. to v. severe
Opulus roseum	2	Slight to severe
Opulus variegatum	1	Slight
Opulus xanthocarpum	2	Nil to mod.
prunifolium	1	Nil
pubescens	2	Nil
pubescens Canbyi	5	Nil
pubescens Deamii	1	Nil
pubescens longifolium	1	Nil
Sargenti	3	Nil to trace
Sargenti calvescens	3	Nil
trilobum	3	Trace to mod.

There is evidently biological specialization in the pathogen for downy mildew has been recorded on V. dentatum, V. nudum and V. pubescens. Names are in accordance with Rehder's Manual of Cultivated Trees and Shrubs. (D.B.O. Savile)

Rust (Puccinia Linkii Klotzsch) was found at Forest Home, King's Co., N.S., on V. trilobum (R.M. Lewis). It was first found in 1942, but the report was delayed pending positive identification of the host. The rate of infection was light but the affected areas are greatly disfigured; for, although infection of the leaf blades causes small, black, amphigenous sori, the sori on the veins, petioles and young twigs are large and elongate and may cause considerable hypertrophy and distortion. This well-known rust has previously been known only from V. pauciflorum, a quite distinct species in the same section of the genus. (D.B.O. Savile)

Leaf Spot (Ramularia Viburni E. & E.). A trace was found in October on V. Lentago at Ottawa, Ont. Numerous sterile spots suggest that the fungus had been more abundant earlier. Previously unreported in P.D.S., but recorded by Bisby et al. from Man., on V. Opulus. (D.B.O. Savile)

INSECTS

Empusa sp. again killed considerable numbers of potato aphids throughout N.B. (J.L. Howatt)

VI. DISEASES OF ORNAMENTAL PLANTS

ALTHAEA ROSEA - Hollyhock

Leaf Spot (Ascochyta parasitica). A trace of infection was seen at Winnipeg, Man. (W.L. Gordon)

Leaf Spot (Cercospora althaeina) was moderate at Morden and heavy at Winnipeg, Man. (W.L. Gordon)

Rust (Puccinia Malvacearum) was common in gardens on Vancouver Island and the lower mainland, B.C. (W. Jones). It was found in several localities in the Okanagan Valley, but damage was usually light or moderate (G.E. Woolliams). Rust was severe in one planting at Edmonton, Alta. (M.W. Cormack). A trace was noted at Winnipeg, Man., on July 19; it was general and severe by Sept. 16 (W.L. Gordon, A.M. Brown). Nearly all hollyhocks at Ottawa, Ont., were heavily rusted; but the high rainfall promoted such vigorous growth that abundant foliage formed above the severely injured lower leaves and long spikes of good blooms were produced (D.B.O. Savile). Rust was moderately heavy at the Montreal Botanical Garden, Que. (J.E. Jacques). It was heavy and destructive in P.E.I. (R.R. Hurst)

Leaf Spot (Septoria malvicola) was moderately heavy on some leaves at Morden, Man. (W.L. Gordon)

ANTIRRHINUM - Snapdragon

Basal Rot (Fusarium oxysporum) affected odd plants in a border at Morden, Man. (W.L. Gordon)

Leaf Spot (Phyllosticta Antirrhini). A light infection occurred at Morden, Man. (W.L. Gordon)

Rust (Puccinia Antirrhini) was found occasionally at Summerland, B.C., but did little damage. (G.E. Woolliams)

Sclerotinia Rot (S. sclerotiorum). Specimens of greenhouse plants were received from a florist at Kingston, Ont., who stated that he had a considerable amount of the disease in his beds. (H.N. Racicot)

Witches' Broom (?virus). One plant at the Experimental Station, Fredericton, N.B., showed a severe witches' broom. (D.J. MacLeod)

AQUILEGIA - Columbine

Mosaic (Cucumis virus 1). One plant of A. caerulea out of several in a garden at Westboro, Ont., showed a striking mosaic; some leaves were nearly normal, some were striped with light green, some were puckered, and many had narrow lobes with pale green tips; the plant was stunted, and the flowers were few and distorted. Inoculation of cucumber seedlings produced a mosaic indistinguishable from that produced by inoculation from mosaic-infected Echinocystis. (D.B.O. Savile)

ASTER

Downy Mildew (Basidiophora entospora), previously reported only from near Toronto, Ont. on A. novae-angliae, was epidemic on this species in the Ottawa district. All clumps in the Macoun Memorial Garden were lightly to heavily attacked. Many large clumps in the Arboretum and in Westboro lost all their lower leaves, and the disease was abundant on wild plants. Infection tends to run along the mid-rib; infected leaves can often be spotted from above by the necrosis along the mid-rib and yellowing of the adjacent lamina; the fungus fruits on the lower surface. A trace was found on a tall

variety of A. novi-belgii at Westboro; on this host little necrosis occurred and the lesions spread diffusely over the lamina. (D.B.O. Savile)

Rust (Coleosporium Solidaginis) was severe on Aster sp. in a border at Morden, Man. (W.L. Gordon). It was widespread at Ottawa, Ont., on A. novi-belgii; in three severely affected clumps there was partial defoliation and the heads were few and small; dwarf forms in the Macoun Memorial Garden were moderately affected. No infection was seen on A. novae-angliae, even when intermixed, in the wild state, with heavily rusted A. cordifolius. This rust was collected on A. novae-angliae near Ottawa a few years ago, but evidently different races were present in 1943. (D.B.O. Savile)

Powdery Mildew (Erysiphe Cichoracearum) was seen on A. novi-belgii at Westboro, Ont.; in some plants a heavy weft of mycelium covered the upper leaf surface, but few or no perithecia were formed; in others, there was virtually no superficial mycelium, but perithecia were fairly abundant on the under side of the leaf; little development occurred before October owing to the wet summer (D.B.O. Savile). A severe general infection occurred on A. novae-angliae var. Barr's Pink, and on A. novi-belgii vars. Beechwood Challenger and Harrington's Pink at Montreal Botanical Garden, Que. (J.E. Jacques)

Rust (Puccinia Asteris) caused little damage to cultivated A. novae-angliae at Ottawa, Ont., but a large patch of wild plants was heavily rusted; intermixed A. cordifolius, known as a host, was free from the rust. (D.B.O. Savile)

Dodder (Cuscuta sp.) caused severe damage to Aster sp. in a nursery at Charleswood, Man.; it was reported to be spreading to and killing young raspberry plants. (W.L. Gordon)

Blight (?virus). A blight of unknown cause attacked all the dwarf A. novi-belgii plants in the Macoun Memorial Garden; Victor was especially severely attacked. The lower leaves and sometimes the whole tops of the plants are killed, but there is no necrosis of the roots and new shoots are sent up from the crown. Killing of the leaves is preceded by feathery and then necrotic spotting. In general appearance and course of development, the disease is similar to blight of perennial phlox and a blight found locally on wild Convolvulus Spithamaeus. (D.B.O. Savile)

BEGONIA

Yellows (Callistephus virus 1). Three plants of B. undine and five of B. wallichiana were severely affected at the Montreal Botanical Garden, Que. The disease was found early in the summer on young China asters that were kept for some time in the greenhouse with the begonias; infection may have occurred then. (J.E. Jacques)

BELAMCANDA - Blackberry-Lily

Leaf Spot (Heterosporium Iridis). A trace occurred in a clump of B. chinensis at Brandon, Man. (W.L. Gordon). A moderate infection occurred late in the summer in a clump at Ottawa, Ont.; the infection was lighter than that on most irises. (D.B.O. Savile)

BERBERIS - Barberry

Rust (Puccinia graminis). Aecia were found on B. vulgaris at Fredericton, N.B. on July 6; infection ranged from 0-65% (S.F. Clarkson). Heavy infections were seen in several new locations at Charlottetown and one at Summerside, P.E.I. (R.R. Hurst)

BOLTONIA

Streak (virus). A trace was found in the border at the Experimental Station, Fredericton, N.B. (D.J. MacLeod)

CALENDULA

Yellows (Callistephus virus 1) was severe in the border at the Experimental Station, Fredericton, N.B. (D.J. MacLeod). It was also found in P.E.I. (R.R. Hurst)

CALLISTEPHUS CHINENSIS - China Aster

Rust (Coleosporium Solidaginis). A trace was present at Winnipeg, Man. (W.L. Gordon). Rust was extremely heavy in a bed in the Arboretum, Ottawa, Ont. Every plant of all varieties was rusted and many in the centre of the bed were completely covered and seriously disfigured. (D.B.O. Savile)

Wilt (?Fusarium sp.). A specimen was received from Perdue, Sask.; Fusarium and Rhizoctonia were present. (H.W. Mead)

Yellows (Callistephus virus 1). Moderate damage occurred in a planting of wilt-resistant varieties at Edmonton, Alta., and a trace was seen at Lethbridge (M.W. Cormack). Yellows was severe on most varieties at Ottawa and Westboro, Ont., but infection was much lighter and less conspicuous in a dark red variety than in all others. As described under Milkweed, it now seems that Asclepias syriaca may be the most important overwintering host for the virus in the Ottawa district, the search for other perennial weed hosts having been unsuccessful. It may further be noted that no yellows has occurred at Ottawa on kok-saghyz (q.v.), although this plant has been growing close to infected Callistephus in the Arboretum. The local restriction in host range may be due to the existence, in this region, either of a particular strain of the virus or of a race of Cicadula sexnotata with restricted host preferences. It may be pointed out that yellows on carrot was first detected at Ste. Clothilde, Que., in 1941 (P.D.S. 21:32) and that in 1943 H.N. Racicot was able to find infected ragweed and sow-thistle in that locality without difficulty. It appears likely that, if yellows of carrot reaches Ottawa, it will be possible to find the disease on some of the other well known weed hosts (D.B.O. Savile). Yellows was common in gardens in York Co., N.B. (D.J. MacLeod). Yellows was very prevalent in P.E.I.; it was also found on Calendula officinalis, Centaurea Cyanus, Chrysanthemum coccineum, C. frutescens, C. Leucanthemum, Gaillardia aristata, Helichrysum bracteatum, Phlox Drummondii, Schizanthus, and Tagetes patula. See also Carrot. (R.R. Hurst)

CAMPANULA

Rust (Coleosporium Campanulae) was first seen in the Ottawa district, Ont., in 1942, when it was reported on C. persicifolia var. Mrs. Harrison's Double Blue (P.D.S. 22:98), and a single rusted specimen of C. rapunculoides was received from Rockcliffe. In 1943 it was found on C. rapunculoides on July 14 in two locations; it became epidemic in August, defoliating many clumps and disfiguring and stunting others. By the end of August, 35 out of 45 clumps of this species under observation in the district were rusted, but no rust could be found on C. persicifolia, even when adjacent to rusted C. rapunculoides, or on other species. The record on Mrs. Harrison's Double Blue is of interest, since C. persicifolia has been reported rusted only in B.C. (P.D.S. 16:72) and California. (D.B.O. Savile)

Blight (Septoria sp.) severely infected occasional plants of C. sp. at Morden, Man., attacking leaves, branches and stems; spores 17-25 x 1.5 microns. (W.L. Gordon)

CARAGANA

Leaf Spot (Septoria Caraganae). A general, slight to moderate infection occurred in hedges at Edmonton, Alta. (M.W. Cormack). At Brandon, Man., infection was moderate, less than in some years; at Morden infection was slight to moderate; and at Winnipeg infection was slight. (W.L. Gordon)

CENTAUREA

Leaf Spot (Septoria centaureicola var. brevispora) heavily infected a single clump of C. Cyanus at Westboro, Ont.; by mid-July the lower halves of the stems were defoliated, severe stem lesions were present, and the plants were noticeably stunted and had smaller and fewer heads than those in healthy clumps. A light to moderate infection occurred in a garden in Ottawa. (D.B.O. Savile)

Yellows (Callistephus virus 1) was seen on C. Cyanus in P.E.I. (R.R. Hurst)

CHEIRANTHUS - Wallflower

Wilt (Botrytis cinerea) killed most of the plants in one row of C. Allionii at Brentwood, B.C. (W. Jones)

CHRYSANTHEMUM

Wilt (Fusarium sp.) attacked scattered plants of C. maximum in a commercial greenhouse at Saskatoon, Sask. (H.W. Mead)

Leaf Spot (Septoria chrysanthemella). A slight infection occurred on the lower leaves of plants in a greenhouse at Edmonton, Alta.; first record in Alta. (M.W. Cormack)

Yellows (Callistephus virus 1) was found on C. coccineum (pyrethrum), C. frutescens (marguerite), and C. Leucanthemum (oxeye daisy) in P.E.I.

CLEMATIS

Leaf Spot and Stem Blight (Ascochyta ?clematidina) slightly affected Clematis sp. at Morden, Man.; spores were 7-15 x 3-4 microns; first record in Man. (W.L. Gordon). About eight species were severely attacked in the Arboretum, Ottawa, Ont., with considerable defoliation and stem girdling. Despite the heavy infection, sporulation was sparse at the time of examination. Spores were 11-14 x 3-3.2 microns, which is considerably smaller than is given for A. clematidina (16-18 x 6-7 microns) but agrees with E. and E. F. Col. 2503. (I.L. Conners, D.B.O. Savile)

Leaf Spot (Septoria Clematidis) was light to moderate at Brandon, Man., on C. ligusticifolia, and was heavy and destructive at Morden. (W.L. Gordon)

DAHLIA

Sclerotinia Rot (S. sclerotiorum). Specimens received from Lloydminster, Sask. bore sclerotia and showed severe basal rot. (H.W. Mead)

Spotted Wilt (Lycopersicum virus 3). At the Montreal Botanical Garden, Que., a whole collection comprising several dozen varieties was discarded because of this disease. The disease was present in 1942 and tuber indexing was used during the winter to select healthy plants. It was intended to take cuttings from the healthy plants only, but, owing to a misunderstanding after a change of labourers, cuttings were made indiscriminately and without precautions from both healthy plants and diseased plants kept for observation, and the disease was greatly spread. (J.E. Jacques)

Stunt (virus) was common in gardens at Charlottetown, P.E.I. (R.R. Hurst)

DELPHINIUM

Powdery Mildew (Erysiphe Polygoni) was unusually heavy on D. cultorum in eastern Ont. and Que., where it seemed to be stimulated rather than inhibited by the wet season. A number of plants were heavily infected at Westboro, Ont.; heavily mildewed leaves were received from Père Léopold, La Trappe, Que.; and all the plants in a garden at Abbotsford, Que. had almost all leaves stems and blossoms, including corollas, completely covered (D.B.O. Savile). Mildew was severe at the Montreal Botanical Garden, Que. and prevalent in the Montreal district (J.E. Jacques). Mildew was moderately heavy in P.E.I. (R.R. Hurst)

Bacterial Blight (Pseudomonas delphinii) attacked a few plants at the Montreal Botanical Garden, Que. (J.E. Jacques). One heavy attack was reported in P.E.I. (R.R. Hurst)

Witches' Broom (?virus). All plants in a garden at Lethbridge, Alta. were severely affected. (G.F. Manson)

DIANTHUS

Bud Rot (Fusarium Poae (Pk.) Wollenw.). A few plants of D. Caryophyllus (carnation) had affected buds in the greenhouse at the Experimental Station, Sidney, B.C.; not previously reported. (W. Jones)

Rust (Uromyces caryophyllinus) lightly infected all varieties of carnation in a commercial greenhouse at Saskatoon, Sask. (H.W. Mead)

DIGITALIS - Foxglove

Leaf Spot (Phyllosticta Digitalis Bellynck) occurred in two adjacent beds in the Arboretum, Ottawa, Ont., on D. argyrostigma, D. ferruginea, D. lanata, D. purpurea (common foxglove), and D. purpurea var. alba. Spots were most numerous on D. purpurea, but damage was worst on D. argyrostigma and D. ferruginea, the lesions often killing half the leaf; D. lanata was slightly affected. The disease did not reach the main Digitalis planting, which was far from the affected beds. Not previously reported. (D.B.O. Savile)

Mosaic and Streak (?virus). Three plants in the border at the Experimental Station, Fredericton, N.B., showed a severe mosaic, crinkling and leaf necrosis. (D.J. MacLeod)

EPILOBIUM - Willow-Herb

Rust (Pucciniastrum sp.). Seedlings of E. hirsutum, received from Europe under the name E. rosmarinifolium, became heavily rusted in October, in the Arboretum greenhouse, Ottawa, Ont. The rust attacks E. tetragonum sparingly and Clarkia elegans heavily. Faull (J. Arnold Arb. 19: 163-173. 1938) gives 19 x 16 microns as the average size for urediniospores of P. Abieti-Chamaenerii and 19 x 14 microns for those of P. Epilobii. In the rust under discussion, the spores average 17 x 12 microns, which is close to the sizes found for earlier collections on Clarkia and Godetia. Examination of specimens of rust on Epilobium spp. (Sect. Lysimachion) reveals a gradation of average sizes from about 17 x 12 to 19 x 14 microns. (D.B.O. Savile)

GAILLARDIA

SMUT (Entyloma sp.) was severe on some plants of G. aristata in a border at Morden, Man. (W.L. Gordon). Entyloma Compositarum Farl. was found on G. aristata in two locations at Ottawa and one at Westboro, Ont., causing considerable shedding of the lower leaves. A study of numerous specimens reveals that the above material, and specimens from Sask. previously regarded

as E. polysporum (Pk.) Farl., are referable to E. Compositarum; spores abundant but not replacing all parenchyma tissue, about 8-14 x 7.5-11 microns, wall 0.5-1.5 (rarely 2) microns, conidia abundant; Fungi Columbiani 3319 on Ambrosia trifida and 5014 on Aster adscendens are in close agreement. Fungi Columbiani 541 and Seymour and Earle Econ. Fungi 292a both on Ambrosia artemisiifolia, issued as E. Compositarum, are E. polysporum and agree well with Roum. Fungi Sel. Gall. 4868; spores densely crowded with disappearance of almost all parenchyma, 10-17 (rarely 21) x 9-14 (rarely 17) microns, wall 1.02-2.5 (rarely 3.5) microns, conidia not seen. Fungi Columbiani 4820 on Gaillardia pulchella and 4917 on Helenium autumnale, issued as E. polysporum, are typical E. Compositarum; both are wrongly cited in N.A.F. 7:1022. Fungi Columbiani 3424 on Rudbeckia hirta agrees well with E. polysporum in all respects but wall thickness, the thick walls, 1.0-5.0 (commonly 2.0-3.5) microns, are so striking that, if other specimens should not reveal intergradations, Ciferri's segregation of this fungus as E. Davisii would seem justified. Among specimens in the herbarium are collections from Sask. on Helenium montanum referable to E. Compositarum, and one from Timagami, Ont., on Aster macrophyllus referable to E. polysporum. There have been several reports of E. polysporum on Gaillardia in Man., but up to the time of writing it has not been possible to examine any specimens. (D.B.O. Savile)

Yellows (Callistephus virus 1). A single infected plant of G. aristata was seen at Ottawa, Ont. (D.B.O. Savile). Yellows was also seen on this host in P.E.I. (R.R. Hurst)

GARDENIA

Bacterial Leaf Spot (Pseudomonas gardeniae Burkh. & Pirone). Specimens were received from Thos. A. Ivey, Port Dover, Ont., who stated: "We are having considerable trouble this year with what we believe to be a new disease. This disease has shown up on all our young potted plants as well as the gardenias in the beds. These spots on the leaves seem to increase in number each week and apparently the disease is spreading very rapidly and will in time destroy our entire stock of gardenias if not brought under control". This is the first Canadian report of this recently described disease. See P.P. Pirone, Diseases of gardenia. N.Y. Agr. Exp. Sta. Bull. 679: 6-7. 1940, and W.H. Burkholder and P.P. Pirone, Phytopath. 31: 192-194. 1941. (I.L. Conners)

GLADIOLUS

Core Rot (Botrytis sp.) severely damaged a lot of Paul Grampel in storage at Regina, Sask.; Botrytis was isolated in pure culture from seven corms (T.C. Vanterpool). This trouble has been recently described by F.L. Drayton (Can. Hort. and Home Mag. Feb. 1944).

Corm Rot (Fusarium oxysporum f. Gladioli). Several infected bulbs were found at Winnipeg, Man. in a lot that had been grown near Keewatin, Ont. (W.L. Gordon). One per cent infection occurred in a small lot brought in for examination at Charlottetown, P.E.I. (R.R. Hurst)

Yellows (Fusarium oxysporum) affected about 20% of plants at Brandon, a trace at Morden, and more than for several years at Winnipeg, Man.; it was severe in the Keewatin area, Ont., up to 50% of corms having to be discarded (W.L. Gordon). Few to many plants were affected with yellows in several gardens in P.E.I. (R.R. Hurst)

Corm Rot (Penicillium Gladioli) caused slight damage to stored corms at Edmonton, Alta. (M.W. Cormack). Two per cent infection was seen in one lot at Charlottetown, P.E.I. (R.R. Hurst)

Scab (Pseudomonas marginata). Moderate to severe damage occurred in several lots of stored corms at Edmonton, Alta.; damage was severe in forced plants in a commercial greenhouse, and was slight in several gardens (M.W. Cormack). Occasional plants were affected at Brandon, Man., and in the Keewatin area, Ont. (W.L. Gordon)

Bacterial Blight (Xanthomonas gummisudans). Moderate infection occurred in a few varieties in a garden at Edmonton, Alta., and slight damage occurred at Lethbridge (M.W. Cormack). A localized outbreak occurred in a planting of cormels at Winnipeg, Man. (J.E. Machacek). A heavy infection caused considerable damage, especially to young plants, in a garden at Simcoe, Ont. (F.L. Drayton)

HELIANTHUS - Sunflower

Powdery Mildew (Erysiphe Cichoracearum) was moderately heavy on H. decapetalus in a garden at Westboro, Ont., late in the season. (D.B.O. Savile)

Rust (Puccinia Helianthi) was moderately heavy on Stella at Brandon, Man. (W.L. Gordon)

HELICHRYSUM - Everlasting

Yellows (Callistephus virus 1) was severe on H. bracteatum in the border at the Experimental Station, Fredericton, N.B. (D.J. MacLeod). It was also seen in P.E.I. (R.R. Hurst)

HESPERIS - Rocket

Basal Rot and Wilt (Rhizoctonia sp.) was severe in a garden at Saskatoon, Sask. (H.W. Mead)

HIPPEASTRUM

Spotted Wilt (Lycopersicum virus 3) affected about 60% of the plants at the Montreal Botanical Garden, Que.; see Lachenalia. (J.E. Jacques)

HYLOCEREUS - Night-Blooming Cereus

Stem Rot (Phyllosticta ?opuntiicola Bubak) occurred on H. undatus in a greenhouse in the Arboretum, Ottawa, Ont. Lesions were few but extensive and causing considerable damage to the branches involved, elongate, white or greyish, finally with many pycnidia; pycnidia irregular and with indefinite ostioles, often lobed as though tending to become compound, sometimes two together; spores 4.0 to 5.5 x 1.6 to 2.9 microns, cylindric, ellipsoid, reniform or clavate; tentatively assigned to this species, but there are many inadequately described spp., on various genera of Cactaceae, that are doubtfully distinct. (D.B.O. Savile)

IRIS

Eelworm (Ditylenchus dipsaci). A trace was found in one planting of bulbous iris on Vancouver Island, B.C. (R.J. Hastings)

Rhizome Rot (Erwinia carotovora) caused 80% loss in the spring, in a large new planting at Brandon, Man. (W.L. Gordon). A few plants of Lady Foster were attacked at the Montreal Botanical Gardon, Que. (J.E. Jacques). A heavy outbreak occurred at Kentville, N.S., about half the clumps being severely damaged (J.F. Hockey). It was reported from 8 gardens in P.E.I., 12 out of 17 plants in one being affected. (R.R. Hurst)

Leaf Spot (Heterosporium Iridis) was less prevalent on bulbous iris on Vancouver Island and the lower mainland, B.C. than in 1942, and caused very slight damage (R.J. Hastings). It was general on all 92 varieties of I. germanica at the Experimental Farm, Agassiz, B.C.; it was very severe on Gazelle, Iris King, Prosper Loughier and Leta Williamson, and slight to severe on all others; it is widely distributed in gardens and causes considerable damage (W. Jones). Infection was severe in gardens at Edmonton and Pine Lake, Alta., and was general elsewhere (M.W. Cormack). A trace of leaf spot occurred at Brandon, and a moderate to heavy infection occurred at Morden, Man. (W.L. Gordon). It was heavy in many gardens in P.E.I. and often caused severe injury. (R.R. Hurst)

Bulb Rot (Penicillium sp.) affected nearly 60% of I. tingitana var. Wedgewood in a nursery at Brampton, Ont. The affected plants were also infected with mosaic. (G.C. Chamberlain)

Bacterial Leaf Blight (Phytomonas tardicrescens). The following species and varieties at the Montreal Botanical Garden, Que. were attacked to the extent shown; T stands for trace, L for light, M for moderate, and S for severe: I. chamaeiris var. italica, T; I. germanica, Prairie Gold, L; Ethelwynn Dubuar, T; Queen Caterina, M; Germaine Perthuis, T; Mount Royal, S; Mildred Presby, L; Corrida, L; Joycette, M; Ethel Packham, M; Georgia, T; Romance, L; Jane Williamson, S; Soledad, L; Hene, L; Ambassadeur, M; Suzanne Antissier, M; Dolly Madison, M; Crusader, L; Lady Foster, S; Mary Barnett, L; I. pumila, Excelsa, T; Florida, T; Formosa, T; Orange Queen, T; Jean Siret, L; Blue Pigmy, T; Schneekuppe, L; Sunny Boy, T; I. reticulata, Hercules, M. (J.E. Jacques)

Rust (Puccinia Iridis) was heavy on I. spuria var. halophila at the Montreal Botanical Garden, Que. (J.E. Jacques). It was heavy on I. versicolor in Kings Co., N.S. (R.M. Lewis)

Crown Rot (low temperature basidiomycete). This pathogen (see Alfalfa) was isolated from severely damaged plants in a garden at Edmonton, Alta. (M.W. Cormack)

Mosaic (Iris virus 1) affected 90% of the plants of I. tingitana var. Wedgewood, the principal commercial variety, in a 10 acre planting, and infection averaged 4% in other plantings on Vancouver Island and the lower mainland, B.C. (R.J. Hastings). About half the plants of an unidentified bulbous iris in a planting at Winnipeg, Man. showed dwarfing, mottling and chlorotic streaking (J.E. Machacek). Mosaic affected 75 to 90% of this variety in a nursery at Brampton, Ont.; the bulbs originated from B.C.; affected plants showed breaking of the flowers and stunting of the flower stalks (G.C. Chamberlain). As has been pointed out by K.M. Smith (Textbook of Plant Virus Diseases, p. 421. 1937) Wedgewood is exceptionally susceptible to this disease; it may be impossible to grow this variety in districts where mosaic is firmly established.

LACHENALIA

Spotted Wilt (Lycopersicum virus 3) severely damaged the collection of these liliaceous plants at the Montreal Botanical Garden, Que.; infection was as follows: L. unicolor and L. Pillansii, 15%; L. unicolor var. fragrans, 25%; L. pendula, 35%; L. mediana and L. odorata, 50%; L. mutabilis and L. Roodeae, 75%; L. ochioides, 90%; L. pustulata, 95%; L. contaminata, L. Gillettii, L. juncifolia, L. ovatifolia, L. pallida and L. tricolor var. Nelsonii, 100%. Affected plants had mottled and malformed leaves. These plants, along with Hippeastrum, Ornithogalum and Tritonia were placed out of doors during the summer and are thought to have become infected from adjacent weeds. (J.E. Jacques)

LATHYRUS ODORATUS - Sweet Pea

Pod Blight (Botrytis cinerea). Slight damage occurred at Centreville, N.S., through rotting of the pods and shrivelling of the seeds. (J.F. Hockey)

White Mould (Erostrotheca multiformis) caused severe damage in one garden on Lulu Island, B.C. (W. Jones)

Streak (Erwinia lathyri) caused slight to moderate damage in several gardens at Edmonton, Alta. (M.W. Cormack). It was heavy in many gardens in P.E.I. (R.R. Hurst)

Wilt (Fusarium Solani) was severe in a few gardens at Saskatoon, Sask. (H.W. Mead)

Anthracnose (Glomerella cingulata). Specimens received from London, Ont. showed salmon coloured conidial masses on many of the lesions. According to the grower, the plants were 2 to 3 feet high and starting to flower before the disease was seen in late June. Then many growing points commenced to curl; if pulled gently the stem tip would break off at a light brown lesion varying from 1/8 to 1 inch in length. Soon the peduncles became affected, a lesion commonly occurring about 2 inches below the lowest bud and causing the flowering portion to topple. New growth starts from below the affected portions, but this may in turn be attacked. This is the first Canadian record of Glomerella cingulata on this host. (I.L. Conners)

Powdery Mildew (Microsphaera diffusa) caused severe damage in many gardens in P.E.I. (R.R. Hurst)

Root Rot (Rhizoctonia sp.) was heavy in two gardens in P.E.I. (R.R. Hurst)

Mosaic (virus) affected 30% of plants in a bed in the Arboretum, Ottawa, Ont. (D.B.O. Savile). It was severe in one garden in P.E.I. (R.R. Hurst)

Basal Rot (cause unknown). Infection was moderate on King Lavender at Winnipeg, Man. (J.E. Machacek)

Bud Drop (non-parasitic) was heavy in five gardens in P.E.I. (R.R. Hurst)

Fasciation was found in three gardens in P.E.I. (R.R. Hurst)

LIGUSTRUM - Privet

Powdery Mildew (Microsphaera Alni) was very common on L. vulgare (common privet) in Lincoln Co., Ont., but caused no damage except for slight defoliation. (G.C. Chamberlain)

Winter Injury. The severe winter of 1942-'43 killed almost all the hedges of common privet in the Kamloops area, B.C.; no new growth from the roots was visible on June 1. (G.E. Woolliams)

LILIUM - Lily

Blight (Botrytis elliptica). A light, general infection occurred at Morden, Man. (W.L. Gordon). Specimens of affected buds and leaves of L. candidum (Madonna lily) were received from St. Thomas, Ont. (I.L. Conners). Blight caused considerable foliage damage to most lilies at the Central Experimental Farm, Ottawa; some plants showed extensive stem lesions, probably due to the same cause. (D.B.O. Savile)

LINUM - Flax

Wilt (Fusarium oxysporum f. Lini). Scarlet flax (L. grandiflorum) proved highly susceptible to wilt in the wilt nursery and in flax-sick soil in

the greenhouse at Saskatoon, Sask.; but wild flax (L. Lewisii) and perennial garden flax (probably L. perenne) seemed to be immune, no post emergence wilting being seen. (T.C. Vanterpool)

Rust (Melampsora Lini). A 5% infection with well developed uredinia was seen on L. Lewisii at Juniata, Sask. (T.C. Vanterpool)

Wilt (cause unknown) severely damaged the entire planting of L. perenne at the Experimental Station, Lacombe, Alta. An unidentified fungus was isolated. (W.C. Broadfoot)

LONICERA - Honeysuckle

Leaf Spot (?Diplodia sp.). A slight infection occurred on L. tatarica at Morden, Man.; a Diplodia, with spores 12.5-22.5 x 7.5-9 microns) was associated. (W.L. Gordon)

Leaf Blight (Glomerularia Lonicerae) affected one plant in a hedge of L. sp. at Pointe Claire, Que. (I.L. Conners)

Powdery Mildew (Microsphaera Alni) was light on a hedge of L. Morrowii at Morden, Man. It was light at Brandon and Morden and moderate at Winnipeg, on L. tatarica (W.L. Gordon). A light infection was seen on L. sp. in P.E.I. (R.R. Hurst)

LUPINUS - Lupine

Stem Canker (Botrytis cinerea). Infection was a trace on blue lupine (?L. hirsutus) at Kentville, N.S. (J.F. Hockey)

Eye Spot (Ovularia sp.) considerably disfigured the foliage of plants on Vancouver Island, B.C. (W. Jones)

LYCHNIS

Leaf Spot (Phyllosticta Lychnidis) was moderately heavy on L. chalcedonica at Ottawa, Ont., the lesions being accompanied by considerable necrosis. (D.B.O. Savile, I.L. Conners)

Leaf Spot (Septoria Lychnidis) was moderately heavy on L. Haageana at Ottawa, Ont., but caused little injury. (D.B.O. Savile, I.L. Conners)

LYCIUM - Matrimony Vine

Leaf Roll (Solanum virus 14) was found in three plants of L. halimifolium growing outdoors at the Laboratory, Fredericton, N.B. (D.J. MacLeod). This appears to be the first record of this virus in Lycium.

MALOPE

Foot Rot (?Fusarium oxysporum) was severe on plants at Brandon, Man.; F. oxysporum was isolated. (W.L. Gordon)

MATTHIOLA - Stock

Wilt (Sclerotinia sclerotiorum). Specimens were received from a florist at Kingston, Ont., who stated that he had a considerable amount of this disease in his greenhouse beds. (H.N. Racicot)

MONARDA

Rust (Puccinia Menthae) was moderately heavy on one clump of M. fistulosa at Ottawa, Ont. and very heavy on a second, which was largely defoliated by late August. (D.B.O. Savile)

NARCISSUS

Smoulder (Botrytis narcissicola). A trace was found in a field of imported bulbs at Falmouth, N.S.; first report from N.S. (J.F. Hockey)

Root Knot (Ditylenchus dipsaci) slightly affected three plantings on Vancouver Island and the lower mainland, B.C. (R.J. Hastings)

NIGELLA

Foot Rot. A single plant of N. damascena (love-in-a-mist) was infected at Brandon, Man.; Fusarium Solani was isolated. (W.L. Gordon)

OENOTHERA - Evening Primrose

Downy Mildew (Peronospora Arthuri Farl.) was very prevalent in Kings Co., N.S., on Oe. biennis Auct.; many plants were completely wilted (J.F. Hockey). Not previously reported in P.D.S., but represented in the Herbarium on Oe. spp. from Sask., Ont., Que., and N.S. It is of interest to note that P. Arthuri was recently found (DAOM 14084) on an unidentified Epilobium in the phanerogamic herbarium, collected on Kodiak I., Alaska, in 1938. As far as we are aware this is the first report of P. Arthuri on Epilobium; it also probably represents a considerable range extension. (D.B.O. Savile)

Leaf Spot (Septoria Oenotherae) was severe on the leaves of a few plants of Oe. sp. in a border at Morden, Man. (W.L. Gordon). It caused premature death of the leaves of evening primrose at the Montreal Botanical Garden, Que. (J.E. Jacques)

OPUNTIA

Superficial Discoloration (?unbalanced water relation). Joints of Opuntia, set to root at Ottawa, Ont., nearly all became discolored the whole surface finally being involved; most joints survived, but were very unsightly. Dr. J.E. Jacques states in a letter in response to a query about this trouble: "Observed on Opuntia and a few other genera of the Cactaceae. I am inclined to believe that the silvery areas which eventually crack and turn brown are caused by an unbalanced water relation. An Opuntia plant was kept under observation for several months - when it was watered sparingly and the soil moisture maintained fairly uniform the brown patches made no noticeable progress; on the other hand, if the plant was given abundant water after a period of drought, the old patches enlarged and many new ones appeared. The discoloration usually begins at the base of the bristles and spines. At first tissues are water soaked and gradually turn silvery to brownish."

ORNITHOGALUM

Spotted Wilt (Lycopersicum virus 3). All plants of O. lacteum at the Montreal Botanical Garden, Que. were severely affected and had to be discarded; see Lachenalia. (J.E. Jacques)

PAEONIA - Peony

Blight (Botrytis Paeoniae). A light infection occurred on all varieties at the University, Saskatoon, Sask. (H.W. Mead). Blight was a trace at Brandon, slight at Morden, and severe at Winnipeg, Man. (W.L. Gordon). It was severe on all plants in a garden at Timmins, Ont. (I.L. Conners). It was general and severe in P.E.I. (R.R. Hurst)

Leaf Blotch (Cladosporium Paeoniae) was general at the Montreal Botanical Garden, Que., and was severe on a few plants. (J.E. Jacques)

Leaf Spot (Septoria Paeoniae). A light infection was found in a garden at Edmonton; first record in Alta. (G.B. Sanford)

Mosaic (virus) affected a few isolated plants at the Montreal Botanical Garden, Que. (J.E. Jacques)

Ring Spot (virus). One plant was lightly affected at Morden, Man., where the disease was common a few years ago (W.L. Gordon). It was severe in P.E.I. (R.R. Hurst)

Chlorosis (excess lime). A trace was seen on odd plants at Brandon, Man., much less than in some recent years. (W.L. Gordon)

Blossom Failure (cause unknown) severely damaged several varieties at Saskatoon, Sask. Buds did not open properly, and petals were thickened and lacking colour; some ring spot was also present (H.W. Mead). According to Dr. F.L. Drayton, such a condition may be due to several causes; Lemoine's disease (reported from Alta.) causes blossom failure but not the petal thickening; Botrytis often interferes with normal opening; and certain varieties are extremely sensitive to weather conditions, opening normally one year and failing completely the next.

PARTHENOCISSUS

Leaf Spot (Guignardia Bidwellii (Phyllosticta viticola) caused slight damage at Ottawa, Ont., to a single plant of P. quinquefolia (Virginia creeper). (D.B.O. Savile)

Downy Mildew (Plasmopara viticola) was abundant on Parthenocissus spp. in the Ottawa district, Ont. (see under Vitis), and on P. quinquefolia at Abbotsford, Que.; not previously reported in P.D.S. on these hosts. (D.B.O. Savile)

PELARGONIUM - Geranium

Grey Mould (Botrytis cinerea) caused spotting of the leaves of two greenhouse plants at Charlottetown, P.E.I. (R.R. Hurst)

PENSTEMON

Leaf Spot (Ramularia sp.). Infection was moderate to severe on some plants of P. grandiflorus and P. sp. at Morden, Man.; spores 22-42 x 3.5-5 microns. (W.L. Gordon)

PETUNIA

Virescence (?virus). A greening of the flower parts was seen on one plant in a garden at Fredericton, N.B. (D.J. MacLeod)

PHLOX

Powdery Mildew (Erysiphe Cichoracearum) is generally so universally heavy by late August in the Ottawa district, Ont., on P. paniculata that it escapes comment. In 1943 it could only be found to an appreciable extent in a few small, well-ventilated clumps or solitary stems, up till mid-September; only in October did its attack become noticeable. (D.B.O. Savile)

Leaf Spot (Septoria divaricata). All the plants of P. Drummondii in a greenhouse at Charlottetown, P.E.I., were heavily attacked. Spraying with Copper Hydro checked the disease effectively. (R.R. Hurst)

Blight (?virus) previously reported from Ont., Que. and P.E.I., is evidently identical with the streak reported from N.B. The former name is here used, because it is the established name in use in the United States and because

the streak symptom is not always conspicuous. Blight was heavy at Ottawa, Ont., infection being 100% in some plantings; severe defoliation occurred in some clumps, and the widespread spotting spoiled the appearance of many others late in the flowering period (D.B.O. Savile). Eight per cent of the plants in the border at the Experimental Station, Fredericton, N.B., were affected. (D.J. MacLeod)

Virescence (?virus). A greening of the floral parts was seen in two plants in the border at the Experimental Station, Fredericton, N.B. (D.J. MacLeod)

Yellows (Callistephus virus 1) was seen on P. Drummondii in P.E.I. (R.R. Hurst)

PODOPHYLLUM PELTATUM - May Apple

Leaf Spot (Phyllosticta Podophylli (Curt.) Wint.) killed large areas of the leaves of plants at the Montreal Botanical Garden, Que.; some leaves died prematurely. (J.E. Jacques)

PORTULACA - Purslane

Wilt (Fusarium sp.) affected 10% of the plants in one section of a field of P. grandiflora being grown for seed at Grand Forks, B.C. (G.E. Woolliams)

POTENTILLA

Rust (Phragmidium Andersoni Shear) was heavy on part of a hedge of P. fruticosa at Morden, Man. (W.L. Gordon). Not previously reported in P.D.S., but recorded in the Herbarium from Winnipeg, Man., and from Alta., Sask. and Que.

Powdery Mildew (Sphaerotheca Humuli) was heavy on some plants of P. nivalis at Morden, Man.; first record on this host. (W.L. Gordon)

RANUNCULUS - Buttercup

Mosaic (?Spotted Wilt - Lycopersicum virus 3). A collection of 50 plants of R. asiaticus giganteus florentinus at the Montreal Botanical Garden, Que., became infected and had to be discarded (J.E. Jacques). The virus of spotted wilt has been reported on Ranunculus and under the circumstances it is the most likely cause of this trouble; see Lachenalia.

RIBES

Rust (Cronartium ribicola) was heavy in a hedge of R. diacantha at Morden, Man.; first record of C. ribicola for Man. (W.L. Gordon). It is now unreported only in Alta. and Sask. Rust attacked a number of Ribes spp. in the Arboretum, Ottawa, Ont., but was particularly heavy on R. orientale, which was seriously defoliated (D.B.O. Savile). A light infection occurred on Ribes sp. in Prince Co., P.E.I. (R.R. Hurst)

Cluster Cup Rust (Puccinia Pringsheimiana). A trace was present on a hedge at Morden, Man. (W.L. Gordon). This record gives the host as R. oxyacanthoides, which is little cultivated; R. hirtellum frequently passes under this name. (D.B.O. Savile)

Leaf Spot (Septoria spp.). S. aurea was moderate at Morden and light at Winnipeg, Man., on R. odoratum (W.L. Gordon). It was very heavy on R. aureum in the Arboretum, Ottawa, Ont., and caused considerable defoliation (D. B.O. Savile). S. Ribis almost completely defoliated a hedge of R. alpinum and was moderately heavy on a hedge of R. ?hirtellum (see under Cluster Cup Rust) at Morden, Man. (W.L. Gordon)

ROSA - Rose

Crown Gall (Agrobacterium tumefaciens) killed five plants of Paul's Scarlet in one garden and was reported from six others near Charlottetown, P.E.I. (R.R. Hurst)

BLACK SPOT (Diplocarpon Rosae) was severe in a garden at Salmon Arm, B.C., especially on a climbing briar rose (G.E. Woolliams). It caused slight damage in a garden at Edmonton, Alta. (G.B. Sanford). A light, general infection occurred at Morden, Man. on R. rubrifolia and other species (W.L. Gordon). Black spot was extremely prevalent in gardens at St. Catharines, Ont.; Rev. Page Roberts, Talisman, Etoile de Hollande, McGredy's Ivory, McGredy's Sunset, Christopher Stone, Edith Nellie Perkins, and Hadley were seriously affected, (G.C. Chamberlain). Many varieties were affected at the Montreal Botanical Garden, Que., and there was some premature defoliation (J.E. Jacques). Heavy infections and some severe defoliation occurred in P.E.I. (R.R. Hurst)

Stem Canker (Leptosphaeria Coniothyrium) was frequently found developing from pruning stubs in Lincoln Co., Ont.; the Poulson hybrid polyantha varieties appeared to be most susceptible. (G.C. Chamberlain)

Leaf Spot (Mycosphaerella rosicola) was light on some leaves at Brandon, Man. (W.L. Gordon)

Rust (Phragmidium spp.). P. americanum was heavy on Rosa sp. at Westboro, Ont. and caused slight defoliation; a single bush in a garden at Abbotsford, Que., was heavily infected and showed some defoliation; the rust has been seen on this bush for a number of years but has never spread to adjacent plants of other species (D.B.O. Savile). P. disciflorum was heavy on General Jacqueminot and moderate on Capt. Hayward at the Central Experimental Farm, Ottawa, Ont., but was not seen on adjacent varieties (D.B.O. Savile). P. speciosum was common on young leaves and shoots of Rosa sp. at Winnipeg, Man. P. subcorticinum was very abundant on cultivated roses at Kentville, N.S., and caused some defoliation (J.F. Hockey). P. sp. was heavy in several gardens at Charlottetown, P.E.I. (R.R. Hurst)

Anthracnose (Sphaceloma Rosarum). A moderate, general infection, lighter than in 1942, occurred on a hedge of R. spinosissima var. altaica at Morden, Man.; a moderate infection also occurred on some bushes of other species. (W.L. Gordon)

Powdery Mildew (Sphaerotheca spp.). S. Humuli was slight generally, but severe on Polyantha varieties at Morden, Man. (W.L. Gordon). At St. Catharines, Ont., Crimson Rambler (Multiflora) was completely covered, its growth stunted and its blooms marred (G.C. Chamberlain). S. pannosa was moderate on R. rugosa at Abbotsford, Que., but did not attack other species nearby (D.B.O. Savile). It was common on ramblers in N.S., specimens being received from Lunenburg, Annapolis and Kings Co. (J.F. Hockey). It was severe on ramblers and slight on other roses in P.E.I. (R.R. Hurst). The host range and geographic distribution of these two rose mildews in Canada is imperfectly understood; contributors to the P.D.S. are invited to sent in specimens, with flowers and fruit, or with variety names, to the herbarium, to help in remedying the situation.

Mosaic (virus) affected odd plants of Rosa spp. at Morden, Man.; it is destructive and is spreading. (W.L. Gordon)

SAMBUCUS - Elder

Leaf Spot (Septoria sambucina) was common on Vancouver Island and the lower mainland, B.C. (W. Jones). It was light at Brandon and moderate at Morden, Man., on S. racemosa. (W.L. Gordon)

SAPONARIA - Soapwort

Leaf Spot (Phyllosticta ?Dianthi Westend.) was heavy on some leaves of S. officinalis at Morden, Man.; spores were 5-17.5 x 2.5-5 microns; Grove regards this organism as a developmental phase of Ascochyta Dianthi Berk., with spores tardily 1-septate, which is recorded on Saponaria in England. (W.L. Gordon)

SCHIZANTHUS - Butterfly-Flower

Yellows (Callistephus virus 1) was found on Schizanthus sp. in P.E.I. (R.R. Hurst)

SEMPERVIVUM - Houseleek

Rust (Endophyllum Sempervivi). Dr. J. Dearness writes that this rust was present in his garden at London, Ont., from 1939 to 1941, but that all plants died in the winter of 1941-'42. The outbreak reported in P.D.S. 22:106 was, therefore, not the first to occur in Ont. (I.L. Conners)

SOLIDAGO - Goldenrod

Rust (Coleosporium Solidaginis) was severe on some plants of Solidago spp. in a border at Morden, Man. (W.L. Gordon). See also Goldenrod.

SYMPHORICARPUS

Powdery Mildew (Microsphaera diffusa) was moderately heavy on a large clump of S. orbiculatus at Ottawa, Ont., late in the season (D.B.O. Savile). A trace was seen on S. albus in Queens Co., P.E.I. (R.R. Hurst)

Leaf Spot (Septoria Symphoricarpi) was heavy on a hedge of S. occidentalis at Morden, Man. (W.L. Gordon)

SYRINGA - Lilac

Powdery Mildew (Microsphaera Alni) ranged from slight to moderate on a few bushes of S. vulgaris at Morden, Man. (W.L. Gordon). Mildew became moderately heavy on S. vulgaris at Ottawa, Ont., in late September (D.B.O. Savile). It was widespread and moderately heavy in P.E.I. (R.R. Hurst)

Bacterial Wilt (Pseudomonas syringae) caused moderate damage in a garden in North Saanich, B.C. (W. Jones)

Leaf Spot. A leaf spot was seen on a single bush at Morden, Man. Coniothyrium sp. and Pleospora sp. were associated. (W.L. Gordon)

Crown Rot and Blight. French lilacs planted separately and in a hedge at Winnipeg, Man., suddenly wilted and died; the trunks tended to split at the base, cortex of crowns and roots was brown and soft; no micro-organisms were associated (J.E. Machacek). This may be graft blight; see P.D.S. 22:106.

TAGETES - Marigold

Basal Rot (Fusarium oxysporum associated) affected odd plants of T. patula var. Little Gem at Brandon, Man. (W.L. Gordon)

Yellows (Callistephus virus 1) attacked 100% of T. patula in a planting in Queens Co., P.E.I. (R.R. Hurst)

THYMUS - Thyme

Snow Mould (low-temperature basidiomycete) was isolated from thyme that was covered with mycelium and suffered moderate damage at Edmonton, Alta. (M.W. Cormack). See Alfalfa.

TRITONIA

Spotted Wilt (Lycopersicum virus 3) affected about 90% of the plants of T. hyalina (Iridaceae) at the Montreal Botanical Garden, Que.; see Lachenalia. (J.E. Jacques)

TULIPA - Tulip

Fire (Botrytis Tulipae) was general in 93 plantings on Vancouver Island and the lower mainland, B.C., but caused slight damage (R.J. Hastings). Fire was found in some commercial plantings at Vernon and Salmon Arm, but usually caused little damage (G.E. Woolliams). Damage was moderate in Wm. Copeland and nil to slight in other varieties forced in a greenhouse at Edmonton, Alta. (J.G. Grimble)

The plantings at the Laboratory, St. Catharines, Ont., showed 100% infection with practically no perfect blooms (J.K. Richardson). Fire was again widespread and severe in Ont. (J.E. Howitt). It was seen in virtually every garden in Westboro, Ont., and was unusually severe (D.B.O. Savile). Fire destroyed 39% of the blooms and marked others in a 2-year-old planting in N.S. (J.F. Hockey)

Storage Rot (Penicillium sp., Fusarium sp., and Sun Scald) caused slight losses on Vancouver Island and the lower mainland, B.C. (R.J. Hastings)

Snow Mould (Typhula sp.) was found on a few samples from Greenwood, B.C. (R.J. Hastings)

Break (virus). Infection ranged from 0.1 to 5% on Vancouver Island and the lower mainland, B.C. (R.J. Hastings). It was found in many varieties being grown commercially at Vernon and Salmon Arm, B.C., infection ranging from a trace to 10% (G.E. Woolliams). One plant each of Bartigon, Bleu Aimable, and Telescopium were infected in a planting of 500 bulbs at Winnipeg, Man. (J.E. Machacek). One plant was found in 1942, at Fredericton, N.B., which showed a striking break; the symptoms recurred in 1943 in plants produced from it; attempts to transit the disease by sap inoculation were unsuccessful and grafting has not yet been attempted (D.J. MacLeod). Break affected 6% of tulips in a garden at Charlottetown, P.E.I. (R.R. Hurst)

Abnormal Growth. In a planting of an unnamed yellow tulip in Queens Co., P.E.I., 80% of the plants had thickened stems, which often cracked and toppled, and extra leaves that tended to be petaloid. According to R.J. Hastings, this condition is a sign of excessive vigour; it may be caused by excess nitrogen or by the planting of mother bulbs; in addition, the stem cracking may be induced by wide variation between day and night temperatures. (R.R. Hurst)

VERONICA - Speedwell

Leaf Spot (Septoria Veronicae) was moderate on some plants of V. longifolia at Morden, Man. (W.L. Gordon)

VIOLA

Leaf Spot (Cercospora Violae Sacc.). A small amount of Cercospora was found on leaves of V. tricolor in a specimen of Phyllosticta Violae, collected in 1928 at Kentville, N.S. We have a specimen identified as C. Violae from Ont., and specimens from Man. and Que. identified as C. Violae-tricoloris Bri. & Cav. The present specimen seems to fit C. Violae most closely, but, in view of the great variation of conidiophore lengths in a single specimen, there is some doubt as to the distinctness of these species. (D.B.O. Savile)

Leaf Spot and Stem Blight (Phyllosticta Violae Desm.). A specimen of V. tricolor collected at Kentville, N.S., in 1928, bore abundant pycnidia of this fungus; first Canadian record. (D.B.O. Savile)

Rust (Puccinia Violae) was abundant on V. tricolor var. Oregon Giant purchased from a nursery at Winnipeg, Man. (J.E. Machacek)

Leaf Spot (Ramularia lactea (Desm.) Sacc.) Caused moderate damage to V. tricolor in cold frames near Vancouver, B.C.; first Canadian record. (J.W. Eastham)

VITIS - Grape

Downy Mildew (Plasmopara viticola) was abundant on wild and ornamental grapes and on Parthenocissus in the Ottawa district, Ont. The following table was compiled largely from the main plantings in the Arboretum; some information concerning Parthenocissus came from elsewhere in the district, but nil infections were disregarded unless abundant mildew could be found close at hand.

Host	No. of Plants	Amount of Disease On Fruit	Amount of Disease On Leaves	Foliage Symptoms
Vitis amurensis	3	Slight to severe	Heavy to v. heavy	Necrosis, slight to complete defoliation
V. Kaempferi	3	None; little fruit	Heavy	Necrosis; slight to moderate defoliation
V. labrusca	1	No fruit	Trace	Necrosis
V. Lecontiana	1	No fruit	Moderate	Necrosis
V. Longii	2	Severe	Trace to slight	Necrosis
V. Piasezkii	1	Slight	Moderate	Necrosis
V. vulpina	3	No fruit	Heavy	Necrosis; slight defoliation
Ampelopsis aconitifolia	1	Nil	Nil	Nil
Parthenocissus inserta	4	Nil	Slight to moderate	Purpling
P. inserta v. laciniata	1	Nil	Nil	Nil
P. inserta v. macrophylla	1	Nil	Slight	Purpling
P. quinquefolia	7	Nil	Nil	Nil

Host	No. of Plants	Amount of Disease On Fruit	Amount of Disease On Leaves	Foliage Symptoms
P. quinquefolia v. ?Engelmannii	1	Nil	Slight	Purpling
P. quinquefolia v. hirsuta	3	Nil	Heavy	Purpling; moderate defoliation
P. quinquefolia v. ?Saint-Paulii	1	Nil	Nil	Nil
P. tricuspidata	2	Nil	Nil	Nil

Readings were made late in September, long after the disease became widespread, and it is thought that the table gives a reliable picture of susceptibility to the predominant local form of P. viticola; it should be noted, however, that physiologic specialization must exist in this species, since P. tricuspidata is listed as a host by Seymour (Host Index of the Fungi of North America. 1929); that P. inserta (Psedera vitacea) is not so listed is ascribable to its confusion with P. quinquefolia. (D.B.O. Savile)

ZINNIA

Yellows (Callistephus virus 1A) caused severe damage in Queens Co., P.E.I., infection being 100% in some gardens. (R.R. Hurst)

INDEX OF HOSTS

Acer 94
Aesculus 94
Alfalfa 17
Alnus 95
Althaea 102
Amelanchier 95
Antirrhinum 102
Apple 80
Apricot 84
Aquilegia 102
Asparagus 41
Aster 102

Barley 11
Bean 41
Bean, Broad 43
Beet 43
Beet, Sugar 34
Begonia 103
Belamcanda 103
Berberis 103
Betula 95
Blackberry 90
Blueberry 92
Boltonia 104
Broccoli 44
Buckwheat 20

Cabbage 44
Calendula 104
Callistephus 104
Campanula 104
Caragana 105
Carrot 45
Cauliflower 47
Celery 48
Centaurea 105
Cheiranthus 105
Cherry 84
Cherry, Sand 88
Chives 49
Chrysanthemum 105
Clematis 105
Clover, Common 19
Clover, Sweet 19
Corn 20
Corn, Sweet 71
Cornus 95
Corylus 95
Cotoneaster 96
Crataegus 96
Cucumber 49
Currant 88

Dahlia 105
Delphinium 106
Dianthus 106
Digitalis 106
Dill 50

Eggplant 50
Elaeagnus 96
Endive 50
Epilobium 106

Fig 92
Flax 21
Fraxinus 96

Gaillardia 106
Gardenia 107
Gladiolus 107
Goldenrod 24
Gooseberry 89
Grape 92
Grasses, Cultivated 37

Helianthus 108
Helichrysum 108
Hesperis 108
Hippeastrum 108
Hippophaë 96
Hop 51
Horse Radish 51
Hylocereus 108

Insects 101
Iris 108

Juglans 96
Juniperus 97

Kok-saghyz 25

Lachenalia 109
Lathyrus 110
Leek 51
Lettuce 51
Ligustrum 110
Lilium 110
Linum 110
Lonicera 111

Lupine 20
Lupinus 111
Lychnis 111
Lycium 111

Malope 111
Malus 97
Mangel 33
Matthiola 111
Melon 52
Milkweed 26
Millet, Foxtail 24
Monarda 111

Narcissus 112
Nigella 112

Oats 7
Oenothera 112
Okra 52
Onion 52
Opuntia 112
Ornithogalum 112
Ostrya 97

Paeonia 112
Parsley 54
Parsnip 54
Parthenocissus 113
Peas 55
Peach 85
Pear 83
Pelargonium 113
Penstemon 113
Petunia 113
Pepper 57
Phlox 113
Picea 97
Pineapple 92
Pinus 97
Platanus 98
Plum 87
Podophyllum 114
Populus 98
Portulaca 114
Potato 57
Potentilla 114
Prunus 98
Pumpkin 70
Pyrus 98

Quercus 98
Quince 84

Radish 70
Ranunculus 114
Raspberry 90
Rhamnus 99
Rhubarb 70
Ribes 114
Rosa 115
Rust Nurseries 16
Rye 14

Safflower 28
Salix 99
Salsify 70
Sambucus 115
Saponaria 116
Schizanthus 116
Sempervivum 116
Solidago 116
Sorbus 99
Sorghum 29
Soybean 29
Spinach 70
Squash 71
Strawberry 92
Sweet Potato 72
Sudan Grass 33
Sunflower 36
Symphoricarpus 116
Syringa 116

Tagetes 116
Thymus 116
Tobacco 72
Tomato 74
Tritonia 117
Tulipa 117
Turnip 77

Ulmus 99

Vegetable Marrow 79
Veronica 117
Viburnum 100
Viola 117
Vitis 118

Wheat 1

Zinnia 119